CHEMICAL LIBRARY AUG 13 1917 UNIV. OF MICH. LIBRARY

GAS JOURNAL

LIGHT ✦ HEAT ✦ POWER ✦ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

Vol. CXXXIX. No. 2827.] LONDON, JULY 17, 1917. [69th Year. Price 6d.

O'NEILL'S
OXIDE
GAS PURIFICATION AND CHEMICAL CO., Ltd.
PALMERSTON HOUSE, LONDON, E.C.
Telegrams: "PURIFICATION, LONDON."
Telephone: 9144 London Wall.

TORBAY METER ENAMEL.
The TORBAY PAINT CO.,
26/28, Billiter St., LONDON, E.C.
39/41, Old Hall St., LIVERPOOL.

PUMPING ENGINES
All Types for ACID, &c.
CAST-IRON OR STEEL TANKS
Any Capacity.
CHEMICAL PLANT.
Roofs and Girders. Structural Work.
SULPHATE OF AMMONIA PLANT
Air and Gas Compressors.
MIXERS.
TAR STILLS AND CONDENSERS.
W. NEILL & SON, Ld.
Engineers, Iron & Brass Founders,
ST. HELENS JUNCTION.
Telegrams: 'Neill, St. Helens.' Telephone No. 20.

"BLUEBELL"
SILICA RETORTS
(95% SILICA)
John G. Stein & Co., Ltd.,
Castlecary, SCOTLAND.

PURIFYING MATERIAL
"Brownox-de-Luxe."
Unqualified Satisfaction given where used.
SPENT OXIDE PURCHASED
J. BROWN & CO., Ltd.
Savile Town, DEWSBURY.

Makers of
GASHOLDERS,
TANKS (C.I. or Steel),
PURIFIERS,
WASHERS,
ROOFS,
&c.
ASHMORE, BENSON, PEASE & CO., LTD.
STOCKTON-ON-TEES.
Complete GAS WORKS
London Office:
32, Victoria Street, Westminster, S.W.
Telegrams: "GASHOLDER."

JAMES McKELVIE & CO.
Coal Owners,
Gas and Steam Coal Contractors,
17, RUTLAND SQUARE, EDINBURGH.
59, MARK LANE, LONDON, E.C.
GUILDHALL CHAMBERS, SANDHILL, NEWCASTLE-ON-TYNE.
24, CHAPEL STREET, LIVERPOOL.
ESTABLISHED 1840.

W. & B. COWAN
(Incorporated in Parkinson and W. & B. Cowan, Ltd.),
LONDON. MANCHESTER. EDINBURGH. GLASGOW.
SYDNEY. MELBOURNE. BRISBANE. WELLINGTON, N.Z.
(See Advertisement on page III. of Wrapper.)

STEWARTS AND LLOYDS, LIMITED, 41, OSWALD STREET, GLASGOW. BROAD STREET CHAMBERS, BIRMINGHAM.
TUBES & FITTINGS for Gas, Steam, Water, &c.

ESTABLISHED — 1851 —
Telegrams: "DRY METERS, LONDON."
Telephone: KENSINGTON, 1140.

George Glover and Co., Ltd.
RANELAGH WORKS
Royal Avenue, Chelsea
LONDON, S.W., 3.

Highest Awards at the Principal International Exhibitions.
Branches at LEEDS (9, Dewsbury Road) and MANCHESTER (Gaythorn Meter Works, Easton St.).

SPECIALISTS IN DRY GAS METERS—SLOT, KEY, AND ORDINARY.
Every meter leaving George Glover and Co.'s works, irrespective of size—and they build up to 3000 Lights—is regulated and tested for soundness at 12 in. pressure, and for registration not only at the ½ in. pressure prescribed by the "Sales of Gas Act," but at 3 in. pressure with full outlet capacity, so as to prevent "slow" registration even when the meter is overworked.
AGENTS FOR THE PATENT M. & M. SELF-LOCKING SLOT METER PADLOCK.

RITCHIE C.I. PIPES FOR GAS & WATER. MIDDLESBROUGH.

R. & J. DEMPSTER, LTD., 54 & 2396 Manchester. SOLE MAKERS OF THE "PAN" AUTO. DUKE BREEZE & COAL WASHER.

Every Mantle manufactured and supplied by the Welsbach Light Co., Ltd., is

BRITISH MADE

by British labour at the Welsbach Factory at Wandsworth, London, S.W. 18.

Welsbach Mantles have stood the test for well over a quarter of a century, and to-day are in greater demand than ever —a proof of their reliability.

THE ORIGINAL AND STILL THE BEST

The WELSBACH LIGHT CO. Ltd., Welsbach House, King's Cross, W.C. 1

And at Birmingham, Bristol, Dublin, Hull, Leeds, Manchester, and Stoke - on - Trent

DONKIN

for

GAS VALVES

SINGLE AND DOUBLE FACED.

EXHAUSTERS, COMPRESSORS, RATEAU TURBO GAS EXHAUSTERS, PUMPS.

THE BRYAN DONKIN COMPANY, LTD.,

Head Offices & Works, CHESTERFIELD.

LONDON OFFICE: MILLBANK HOUSE, Wood Street, WESTMINSTER, S.W.

Chesterfield Telephone No. 84.
London Telephone No. 5358 Victoria.

Chesterfield Telegrams, "Donkin, Chesterfield."
London Telegrams, "Donkin, Vic. London."

GAS JOURNAL

LIGHT · HEAT · POWER · BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXXXIX., No. 2827.] TUESDAY, JULY 17, 1917. [69TH YEAR.

EDITORIAL NOTES.

The Sliding-Scale in Disgrace.

THE sliding-scale as applied to gas prices and dividends appears to be in deep disgrace at the present time—in both this country and America. From an early period in the war, the "JOURNAL" has drawn attention to the actual, and possibly worse, effects upon dividends and capital values of the operation of the system in exceptional circumstances. Gas companies have also approached the Gas Companies' Protection Association and the National Gas Council in regard to these effects. The former in response adopted a *non possumus* attitude; the latter moved, but were met in their turn by a similar attitude on the part of the Board of Trade, who may have been influenced by the inertia and "nothing "attempted" policy of the Protection Association. Temporary relief is all that is asked for, pending the time when the terms of the sliding-scale can be generally remodelled in order to compass extraordinary emergencies and to bring it into harmony with the changes of conditions—in respect of materials, labour, and so forth—when an approximate assessment of them can be made, that have arisen since the application of the system. The word "impossibility" blocks relief—relief desired more particularly by those who are dependent upon incomes from an industry which they had thought to be almost as safe, come what might, in its returns upon investments as Government securities. The remarks of Mr. Edwin Upton at the recent meeting of the National Gas Council are recalled [see "JOURNAL" for June 12, p. 515]; and there is also knowledge of gas stock holders who think there is something radically wrong with a system that can "let them down" in the dismal manner that the sliding-scale has done when their outgoings in all directions have taken upward flight through the national demands, higher producing costs, and undue profiteering. "Impossibility" in such a small thing in the case of a nation that has created an army such as we have, provided munitions that have astonished even enemy braggarts, and that has brought so much into operation in the way of war-time control! The ex President of the Institution of Gas Engineers (Mr. A. E. Broadberry), in his Presidential Address, also, in effect, declared that the sliding-scale has encouraged lax upkeep and provision of reserve plant. That, however, is a matter of mal-administration; and it is a very perfect system that can be made quite fool-proof. While prudence dominates the Boards of gas directors which we know most intimately, there is agreement with Mr. Broadberry that there are improvident Boards. Now we have the Massachusetts Board of Gas and Electric Light Commissioners, after nine-and-a-half years' experience of the working of the system in connection with the Boston Consolidated Gas Company, speaking in anything but commendatory terms of the results of its operation, and caring little whether or not the system is completely withdrawn.

In this connection, we should like our American friends to be clear about the views almost consistently held in this country regarding the sliding-scale. Though there are to-day plenty of people massed in favour of its amendment to secure better protection for stock and share holders, a distinct difference is drawn as between the operation of the system in normal and abnormal times. It is a defect of the system that it makes no provision for extraordinary conditions such as those of the present; and the other defect is that it has been moulded and continued in such definite form that it allows no opening for revision under competent sanction when permanent changes have come upon the financial conditions—such as costs of operation in respect of materials, labour, taxes, and so forth, which are removed from any governing power on the part of the undertakings. These conditions had set-in here well before the war; and we now know that the old standards of costs are permanently cast at a higher level. But otherwise there is the firmest belief in the principle and the intrinsic and practical value of the sliding-scale—providing the conditions of the times are in proximate harmony with the terms on which the system was instituted—as regulating the position between consumers and company, as giving confidence, and as creating a partnership between patronage and good management. The Massachusetts Board do not absolutely condemn the sliding-scale as worthless—in fact, they do not question its theoretical soundness, but "its conversion from a working theory "into a fixed rule, expressed in any given case in the inter-"relation of a standard dividend with a standard price may "be another matter." However, comments and recommendations which are brought out in an article elsewhere in this issue, are indicative of their views. The recommendation that it is inexpedient to extend the sliding-scale to the other gas companies of the Commonwealth admits of no other meaning than that the Commissioners' experience is that there is no particular value in the system. They compare the results of the Boston Gas Company with those of other gas companies; and they find that, in manufacturing costs and in charges to the consumers, the companies who are not under the sliding-scale are doing equally as well as the Boston Company.

But the Board have not had experience of the sliding-scale in the case of a company that is an entity without such subsidiary company connections as operate in the case of the Boston concern. This might make a considerable difference. From one of these companies the Boston Company purchase gas; and consequently the cost of the gas into the holder is regular over long periods. To the extent that gas is purchased in this way, the Boston Company have not the advantage of dealing with the secondary products of the coal carbonized; and in this way the operation of the sliding-scale is, the Commissioners hold, deprived of the business skill and sagacity that would be bestowed upon their production and marketing by the Boston Company. It will be seen from this that there are exceptional circumstances surrounding the only direct experience that the Board have had of the results of the sliding-scale; and this discounts much of their criticism and the recommendation quoted as to the inexpediency of applying the system to other gas companies in the State, and which decision also reflects the view of the companies themselves, who have expressed no desire to come under the system. At the same time, the deductions of the Board from the Boston experience as to the effect on the operation of the sliding-scale of working with subsidiary companies, must not be regarded as settling whether or not there is advantage in such a system. Advantage or otherwise depends upon financial relationships and operations. We can conceive of schemes of auxiliary co-operative companies through which considerable economies might be derived by concentrating gas manufacture, and by working-up and dealing with secondary products on the large scale, with a resultant profit far in excess of what could be realized by any amount of business skill and sagacity exercised by the individual Boards. Circumstances alter cases. But it is certain that the Commissioners are convinced that the association of the Boston Gas Company with the subsidiary companies is not to the advantage of the Boston consumers; for "the trading relations of the affiliated companies "of the Massachusetts Gas Association forced upon the

" Boston Company by their common ownership, are incon-
" sistent with the purpose and theory of the sliding-scale
" as a scheme of regulation." Again: "If profits can
" reach the stockholders of a gas company under the sliding-
" scale by any other means than through its dividends, the
" basis of control is impaired if not wholly destroyed." The report indicates a condition of affairs which has no parallel in this country. Taking all the circumstances into account, the Board recommend that the Act applying the sliding-scale to the Boston Company shall be repealed unless the undertaking is entirely dissociated from the Massachusetts Company. In this event, the Board propose new legislation, which, with their criticisms of other matters, will be found in the article on a later page.

If " faint praise damns," then this report, which is destitute of traceable commendation, means that the sliding-scale is not going to make any further headway in Massachusetts, nor probably in any other of the American States. But the report itself indicates that general judgment has been formed on a basis of experience that (unless another complexion can be put upon it by the Boston Company) is vitiated by unusual circumstances, and not the most congenial to the effective working of the system.

High Makes and Charge-Steaming at Macclesfield.

LARGE makes per ton of coal of good combustible gas, and up to statutory calorific standard, is a condition that all gas engineers desire, but all cannot attain for various reasons —sometimes because their carbonizing plant is inefficient, sometimes on account of the character of the coal employed. However, the great point of immediate and prospective interest is how to realize the largest makes per ton of given coal, and supply consumers with gas of good flame temperature at as low a price as possible, and not gas so adulterated with inert constituents that flame temperature is seriously depreciated. The Coal Controller, advised by Mr. Thomas Glover, has lately been urging, with the view to aid coal economy, the dilution of a good quality coal gas with blue water gas cheaply made from coke; and a large number of gas engineers are complying. Mr. J. E. Blundell, at Macclesfield, is accomplishing the same end by passing steam through the charges in his Glover-West vertical retorts, and so has increased the nominal producing capacity of his plant by about 25 p.ct. The steaming of charges is an old proposition that has been little practised; but the relative advantages of steaming in the retorts, and of separately making blue water gas and then diluting the coal gas with it, have been the subject of spasmodic discussion on the Continent. Generally, the separate practice has been preferred; but this has been under conditions different from those of Mr. Blundell. Still, under his conditions, it will have to be shown that steaming has no deleterious effects upon the retort structure, and information will be required as to fuel and coke-for-sale results, and the chemical characteristics of his gas and tar, in order to arrive at a definite decision.

These other particulars, which will either make complete the case for steaming in Glover-West retorts or will give ground for considerable debate, will probably be supplied before long by Mr. Blundell in a paper to be read at a meeting of one of the technical organizations. Meantime he has kindly supplied us with just sufficient information for an article which will sharpen interest, lead to a turning-up of notes on similar investigation, and probably induce other gas engineers in a position to do so to prosecute research on their own account. However, here we have the facts presented that, from a mixture of Yorkshire, Derbyshire, and Staffordshire coals, Mr. Blundell is getting with steaming—these are figures from two separate tests—from (say) 15,200 c.ft. to 15,500 c.ft. of a gas round about 510 B.Th.U., with tar-washing; and during May and April he was making per ton of coal 15·7 gallons of tar and 33·35 gallons of 10-oz. ammoniacal liquor. These figures are highly interesting, and deserving of congratulation. We have not for publication an analysis of the gas. This is reserved. But analyses of different samples have been seen; and we can vouch that they show satisfactory figures in respect of the percentage of inert constituents. In realizing these results (so the investigations have fully satisfied Mr. Blundell), an all-important point is the question of suitable heating of the retorts—the temperatures throughout the vertical length, and the zone of highest temperature. The Glover-West system of heating by means of separate chambers enables the regulation of temperatures precisely as and where required; and the researches have led to the decision that the highest temperature should be towards the lower end of the carbonizing portion of the retort. From a series of experiments to determine this, it has been found that the improper distribution of heat could easily give a gas with a high content of carbon dioxide, which in properly heated chambers is converted into carbon monoxide.

In the article, the subject recurs (after long rest) as to the advantage or otherwise of a free space at the top of the vertical retort. Mr. Blundell has made experiments in this direction; and he finds that a free space of larger volume than is the usual practice shows that " an increase of heavy
" hydrocarbons in the gas is obtained, which indicates that
" it is possible that the production of water gas within the
" retort may be still further increased without detriment to
" the calorific value "—of the total gas. More information will be required on this point. In his Institution paper in 1906, Mr. Thomas Glover gave excellent theoretical reasons for increasing the free space at the top of the retorts. The theory is that the splitting-up of the complex molecules which would otherwise go to make tar is done by the radiant heat within the free space above the coal during the time the volatile products pass to the ascension pipe from that part of the charge where they were liberated. The free space has also its disadvantages. Much knowledge as to carbonization, drawn from experience and chemical and physical research, has flowed during the past eleven years; and the practice now is heavy charges—in some cases full retorts—and longer duration carbonization. Free space is very largely ignored, or much reduced. More of the former provision in this respect has been occupied with coal with considerable carbonizing advantage and with a proved lessened destruction of gaseous constituents. But now it seems that Mr. Blundell with vertical retorts is proposing to retrace his steps to a larger free space. A solid balance of profit must be shown. Again, we take it, the necessary data will all be forthcoming in good time. However, there is intimation in this connection of a still larger production of gas per ton of coal carbonized with steaming, " without detriment to
" the calorific power." Already upwards of 15,000 c.ft. are shown; mouths will water at (say) 16,000 or 17,000 c.ft. However, without being too hopeful before the whole of the facts are available for examination, the information so far disclosed certainly warrants the view that investigation and practice are under way at Macclesfield which will be very valuable in these times.

Gas and Electricity Regulations in Germany.

IN the brutal work of murdering British civilians and of destroying their homes, the nocturnal journeying Zeppelins have now been succeeded by daylight raiding aeroplanes, which the docile and credulous people of Germany believe are engaged in demolishing works of military importance. In the nights when the Zeppelins came, in order to render their occupants as little assistance as possible in their vile mission, all sources of illumination that were likely to act as guides to the men thousands of feet overhead with bombs for the defenceless sleeping men, women, and children below were brought under regulation and control; and this had the effect of reducing not only the consumption of gas and electricity, but proportionately of the materials used in the production of these lighting agents. But the war—would that some other cause had ruled!—has brought to both its business compensations, in increased industrial demand for munitions work, and, through the trouble with coal distribution, demand for domestic heating. Suggestions have also been made by the authorities with the view to realize still further consumption economies. But the many operations of the gas industry for the nation, and the contribution that electricity is making to industrial power supply in connection with munitions manufacture, place both industries—that of gas supply in particular—on such an indispensable plane that there is little or no chance, without damaging production efficiency, of effecting further economies. Germany appears to have entered upon a period in relation to gas, electricity, and coal supply considerably worse than that now being experienced in this country. Though the inhabitants of the enemy country had difficulty last winter (which was a severe one) in obtaining all the coal they required, and so in Berlin exhausted the stocks of gas and electric heaters, the edict has now gone forth that there is to be a reduction in the consumption of gas and electricity, which, through the war and the general shortage of coal, has

been ascending by leaps and bounds. The prospect does not look a particularly happy one for the people of Germany next winter, with the available coal still more diminished perhaps than last winter, and the consumption of gas and electricity more rigorously disciplined. What happened in Berlin last winter in regard to the exhaustion of gas and electric heaters, no doubt occurred in most other parts of Germany, which has probably no metal to spare now for the production of such aids to human comfort as gas and electric fires. As a matter of fact, the installation of new gas fires and stoves has already been forbidden in Frankfort and certain other towns.

This prohibition should assist in preventing the increased use of gas and electricity for domestic heating; but, as here, those responsible in Germany for producing regulation—a Special Central Electricity and Gas Department has been created—find it somewhat difficult to make prescriptions for the lessening of the consumption of gas. The obstacles to a reduction of consumption other than from favourable atmospherical conditions, under the circumstances of gas supply, were discovered in this country when the celebrated 10 p.ct. request of the Board of Trade was first promulgated, which request died a natural death. Germany has no alternative but to decree a 10 p.ct. reduction of the consumption of electricity, which it is expected will be extended from Berlin to the whole of the German Empire. Nevertheless, the supervising body are not without hope of finding some way of applying restriction to gas. It will be extremely interesting to learn what lines, if any, are found practicable. It will also be interesting to know whether the compulsory reduction in the use of electricity—this, of course, does not apply to the war material-producing industries—is to bear any penal consequences for non-compliance, as well as the lines on which saving is effected.

The "Vossische Zeitung," from an article in which the information (given here and elsewhere in this issue) is obtained, and for drawing attention to which we are indebted to an old friend, suggests that consideration shall in the first place be bestowed upon lighting, in which direction German towns, and particularly in buildings of public resort, appear to have gone in for quite a barbarous debauch in illumination—the lighting having been continually on the increase with augmented dazzle, and therefore with injurious effect on the eye. All this our authorities have suppressed here by their regulations. The "Vossische Zeitung"—it is the way of lay writers on such matters—thinks the question of producing a reduction is a perfectly easy one for the people. "All that one has to do is to look at one's electricity "bill for the previous year and using one's electricity meter, "to arrange to use 10 p.ct. less than one did before." Very good; it sounds so simple. The householder, however, will ask, "How much electrical energy did I use on July 17, or "any other day last year?" He cannot tell; and neither his meter nor his account can inform him. He is nonplussed; and, desirous as he may be to comply, he is deprived of a basis upon which to go. It would therefore be unsafe to adopt the suggestion. But an alternative way is proposed. It is that existing lamps be changed for ones of lower candle-power, or the length of the time of lighting be curtailed. The latter is a course that recollection does not enable one to take with confidence, and atmospherical conditions come in to disturb the plan. The suggested change of lamps means something which would break down the present resources of German makers, who have put up their prices, which, even were supply abundant, would act as a deterrent. But the suggestions only refer to lighting. What of the other directions in which electricity is used, apart from munitions work? Moreover, 10 p.ct. reduction in the consumption of current does not necessarily mean 10 p.ct. reduction in the consumption of coal. The consumption of coal per unit of output largely depends on the load on the generating plant.

We do not envy the work of Prof. Kübler, who has been entrusted with the management of the Special Central Electricity and Gas Department. But in Germany they have a more brusque way of insisting on the observance of their decrees in such matters than we have in this country. So if 10 p.ct. reduction in electricity has been ordered, no doubt 10 p.ct. there will be, with something over as a margin of safety. Be that as it may, there is no harm in congratulating ourselves that we have not in this country come to quite such a serious pass in the matter of coal, gas, and electricity supply as the information suggests is the case in Germany.

Benzol and Competition.

Just recently particulars were given in these columns regarding the high dividends paid by some of the oil companies [June 26, p. 617], the Shell Transport Company among them; and, in a preceding paragraph in the same issue, there was reference to what is to happen in placing the increased production of benzol on a strong commercial footing after the war. It will be remembered the National Gas Council have their eyes on cultivating business for motor car purposes, in which connection benzol will not, as before pointed out, be allowed a "walk over" by the extraordinarily strong financial concerns which govern the oil market. This may be taken for granted. It is obvious from what transpired at the meeting of the Shell Company last week that there is very close co-operation between some of the more important oil companies, and this co-operation has to be reckoned with. A couple of passages, too, from the speech of the Chairman (Sir Marcus Samuel, Bart.) provide an earnest of future intentions: "The Directors are of opinion that commercially the Company's enterprises are laid upon such sound foundations, and are so well equipped, that they have nothing to fear from any new schemes or competitors. Nevertheless the Directors will continue to further strengthen the producing and selling organization, based upon the knowledge acquired in conducting this great and complicated petroleum business in every part of the world."

In Search of the Right Grade of Gas.

When the Institution of Gas Engineers met in June, it had a Gas Heating, Lighting, and Ventilation Research Committee. Apparently from the minutes of the last meeting of the Council, the Committee has been rechristened the "Gas Components Committee." It does not matter, however, by what name it is known; the task before it of investigating, without being limited by any calorific value standard, the grade of gas that offers economy and a high flame temperature is one of vital importance to the industry, with competitors searching in every nook and corner for contributions to more economical working on their part. It is a battle of brains in the industries that is now proceeding for the coming great industrial and commercial revival and development. We are interested in seeing that both the South Suburban Gas Company and the Birmingham Corporation Gas Department have placed at the disposal of the Committee their valuable resources and assistance in the prosecution of the research. The Chairman of the South Suburban Company (Mr. Charles Hunt) has been keenly interested in this question of more economical gas production, and the attaining of high flame temperature by supplying consumers with a gas well favoured in the percentage of combustibles; and when the question was introduced in the "JOURNAL" as one that with the movements of competitors and after-war requirements should be taken in hand, Mr. Hunt wrote to say that the Company were undertaking an inquiry on the lines suggested [see April 24, p. 152]. The offer of the Birmingham Gas Department is also one for which the industry will be particularly grateful, in view of the working-scale experimental plant possessed by it, and the ability there to work under all possible conditions of carbonizing temperatures and dilution. Besides, on the chemical staff, headed by the Chief Chemist (Mr. E. W. Smith, M.Sc.), are men who, long accustomed to research work, will be only too glad to render Prof. Cobb and the Committee all possible assistance.

Gas-Works of Local Authorities.

The difficulties which have had to be faced and overcome in the past financial year continue to be emphasized by the reports which have come to hand the last week or two in regard to the working during the twelve months to March of certain municipally owned gas undertakings. In the case of Belfast, the gross profit on the manufacture and sale of gas and residuals is less than half what it was a year ago; but, apart from high costs, there is every cause for satisfaction—the output of gas showing an increase of 72 million c.ft. In fact, "the citizens are coming to realize that for convenience and economy gas is the best medium for lighting, heating, or power purposes." At Blackburn, on the other hand, where is a net loss on the year's working of £4639, the consumption of gas shows a decrease of 6¾ p.ct. As to Carlisle, the gas-works net revenue account for the year shows a deficit of £298, making, with the adverse balance brought forward from last year, a total deficit on his account of

£773. The gross profit is greater at Coventry; and of the surplus £5000 is to be paid over in aid of the rates. At Heywood there is a trifling net loss, which is accompanied by a decrease in the quantity of gas sold. From Kendal comes an interesting comparison between the results attained with horizontal retorts and the new installation of Woodall-Duckham verticals—the latter exhibiting a large net saving in cost. The quantity of gas sent out was 6½ per cent. less than in the previous year.

Further Figures.

Another instance of an increased gross profit is to be seen in Leeds, where the sale of gas increased by close upon 5 p.ct. While less is used for lighting purposes, the war has created a great development in the gas-furnace branch. It has, in fact, increased the consumption for this purpose by 180 p.ct. The accounts at Mossley show there is a net loss of £725 on the past year's working; the quantity of gas sent out from the works having fallen off to the extent of practically 6½ p.ct. It is pointed out in the report that the charges for capital, taxes, and rates amounted to more than one-third of the total revenue. The net profit of £2240 at Oldbury compares with £3277 a year ago. Here, again, more gas was sold for power purposes. There is reported from Ossett a decrease of somewhere about 5 p.ct. in the quantity of gas sold—due to lighting restrictions and the Summer Time Act. After deducting interest and sinking fund charges, there is a loss on the year's working of just under £1000. But 75 p.ct. of this is represented by the increased amount paid for income-tax. As to Rochdale, the net profit of £3741 compares with £15,000 a year ago. The gross profit is only £6000 less; but there is an increase of £5000 in the charge for income-tax, which further materially lessens the surplus. As the sum available is inadequate to meet the annual charges for reserve fund and working capital, there is a debit balance on revenue account at the commencement of the new financial year. The gas sold at West Bromwich increased 1 p.ct.; a considerable reduction over the first nine months of the year being more than recovered in the last quarter. There also comes from Workington an interesting comparison, relating to Woodall-Duckham vertical retorts. It is stated that "the price of gas would have been at least 8d. per 1000 c.ft. more," if they had been working on the old lines. Considerably more gas was sold; and the gross profit is somewhat higher.

Coke and Electrical Station Engineers.

Truth will out. The Coal Controller's recent suggestions as to how to save coal have dragged truth into prominence. There are electrical people who want no fuel connections with the "shop next door." Fear as to some terrible hidden results possess them. The "Electrical Times" confesses as much. Recommendation No. 2 [*ante*, p. 75] counsels the use of locally produced coke as much as possible in lieu of coal. Our contemporary fences with the proposition—not with real ascertained data, but with arguments that have their antitheses in other experience. It knows of works that started to burn coke or coke breeze, after spending a good deal of money on furnace adaptation, but found the fuel ceased to be available. This is an admission of electrical foolishness and shortsightedness. Why was not a coke contract made, and so a supply assured? The objection to change is also raised that, using coke as fuel, those stations without spare boiler capacity could not meet their present load. Very well, what about those that have spare plant? We are to-day searching for economy, and not for grounds for cavilling and obstruction. In the tail of this particular comment of our contemporary truth and cause are found combined. They say: "Also there is a pretty general feeling that coke feeding puts the electrical people at the mercy of the gas interests." There is material evidence that such a timid feeling does not exist generally among electrical engineers. What does it matter to them where their fuel comes from, if by its use there are shown good evaporative duty and plant efficiency, and low fuel cost per 1000 gallons evaporated? As to a business alliance with the gas industry, does not electricity give electrical undertakings sufficient stability to resist any danger from coke buying? If not, there is hollowness in the noisily promulgated virtue of their commodity for doing practically everything better and cheaper than it has ever been done before. There is one other point. If there is so much wrong with coke-feeding from the gas industry, why is the electrical industry still talking so much of coal carbonization on its own account? Is it going to gasify all the coke it hopes to make, or feed it direct into boiler furnaces? There are central station engineers who, despite the "Electrical Times," are at the present time putting boilers in a condition for coke use. Perhaps a little meditation over the data presented with Mr. E. W. L. Nicol's article on June 19 [p. 576] will counteract the timidity which our contemporary admits does exist—if not in fact, in its own fertile imagination.

Abbreviations and Symbols.

Abbreviations and symbols should only be used in writing or any publication for the public eye on two united grounds—economy of space and time, and if they do not depreciate the educational value of the published material by importing into it something that is not appreciated by all readers. The Institution of Heating and Ventilating Engineers are proposing the unification of symbols and abbreviations used in the science and practice of heating and ventilation; and the Council of the Institution of Gas Engineers have been invited to consider the matter. The latter have decided that, while the present is an inopportune time for coming to a decision on so important a question, they are prepared—provided the proposal is approved by other technical bodies—that the term "therm" should be adopted in place of "B.Th.U.," to distinguish it from the B.T.U. (Board of Trade electrical unit), and that the symbol shown elsewhere should be employed to denote it. The list of contractions and symbols as suggested are reproduced on p. 106. But for the life of us we cannot see what gain they are going to be over recognized abbreviations, which are thoroughly well understood, as they carry on their face their meaning. Take, for example, the proposed contraction "therm." There is no saving of either space or time in its use over "B.Th.U.;" and if the "h" adjoining the "T," as well as the context, is not a sufficient safeguard against confusion with "B.T.U.," then surely there must be a deficiency somewhere or gross carelessness on the part of the erring person. Fancy speaking to the man in the street of a gas of 500 therms., or putting before him an account of the efficiency of something or other with the (to him) mysterious expression in it composed of the symbols for "therm" and "per." He would very properly eye one with a great deal of misgiving. What real gain, too, is there in using "ft.^{2}" or "in.^{2}," or any symbol, for "sq. ft." or "sq. in." The same with "ft.^{3}" and "in.^{3}" for "c.ft." or "c.in." There is much more likelihood to be confusion promoted by the misreading of the "^{2}" and the "^{3}" than there could possibly be by the "sq." or "c." The other suggestions for contractions or the use of symbols refer to expressions so rarely required that there is little use troubling about them. Unless there is some real gain, let us keep to expressions that are understood by all—by the showroom man, the fitter, and the customer alike with the engineer, manager, and chemist—for, in so doing, we shall be conferring the greatest benefit. We do not want to use a few symbols or unusual contractions merely to give printed matter a pseudo or added scientific appearance.

Société Technique du Gaz en France.

The annual general meeting of the Société Technique—held recently in Paris, and the occasion of the short papers already published in the "JOURNAL"—was followed by a luncheon, of a simple character appropriate to the times, at which M. Rouland briefly reviewed the affairs of the Society, and paid a warm tribute to the sister association, the Professional Syndicat. In this connection he acknowledged in cordial terms the untiring effort on the part of the French gas industry of the President of the Syndicat, M. René Masse. M. Masse, in responding, expressed the indebtedness of the gas industry to M. Rouland. Among other guests at the luncheon were M. Gabelle, the Director of the Conservatoire des Arts et Métiers, and Mr. R. S. Gardiner, who, as representing Great Britain, was accorded a very hearty reception. M. Rouland has been re-elected President for the year 1917-18. The Vice-Presidents are: MM. Delebecque, Kaeuffer, and Laurain. The Secretaries are: M.M. G. Gauthier and R. d'Estape.

Nitrogen Fixation in Germany.—The "Chemical Trades Journal" says that the production of ammonia in Germany by the Haber synthetic process, according to the "Frankfurter Zeitung," rose from 30,000 tons in 1913 to 60,000 tons in 1914, to 150,000 tons in 1915, and to 300,000 tons (estimated) in 1916. An output of 500,000 tons of ammonia is anticipated for 1917, containing 100,000 tons of nitrogen. At the same time 700,000 tons of sulphate of ammonia (140,000 tons of nitrogen) and 400,000 tons of calcium nitrate (80,000 tons of nitrogen) are expected to be produced—the total including 320,000 tons of nitrogen, which exceeds by 100,000 tons the entire consumption of nitrogen in Germany in 1913.

PERSONAL.

Mr. ARCHIBALD STEWART, Assistant at the Airdrie Gas-Works, has been appointed Gas Manager at Blairgowrie. He succeeds Mr. Andrew Terrace, who recently resigned.

Mr. T. J. C. JORDAN, the younger son—he is only just 18 years old—of Mr. Thomas W. Jordan, the Managing-Director of the Manchester Paint and Varnish Company, has joined the Mechanical Transport Section of H.M. forces.

The Bradford Corporation Gas Committee have appointed Mr. A. R. KNIGHT to be Assistant Chemical Works Manager and Works Chemist, and have advanced the salary of Mr. PERCY WARD, the Manager of the Chemical Works, from £200 to £350.

Captain E. W. BROADBERRY, of the 1st/7th Essex Regiment and the R.F.C., eldest son of Mr. A. E. Broadberry, M.Inst.C.E., the Engineer of the Tottenham District Light, Heat, and Power Company, is in a hospital in London, recovering from a gun-shot wound in the leg.

At the Council meeting of the Institution of Gas Engineers on the 5th inst., Mr. ALEX. GEORGE CHEAL, of the Crowborough District Gas Company, and Mr. STEPHEN LACEY, of the Gas Light and Coke Company, were approved as candidates for membership; and Mr. GEORGE HARRY SHENTON, of the Rainford Gas Company, for associate membership.

The Directors of the European Gas Company, Ltd., in their notice to the shareholders calling the annual meeting for to-day, record, with much regret, the death of their colleague, Mr. HENRY C. SMITH, and of Mr. H. J. LUFF, one of the Auditors. Pursuant to the regulations of the Company, the Directors have filled up the vacancies—nominating Mr. JOHN MEWS as a Director, subject to confirmation by the shareholders at the meeting, and Mr. G. C. GOLDSMID to act as Auditor until to-day.

OBITUARY.

JOHN MILES.

IN his 77th year, and after a busy life, during which he never lost touch with the gas industry, Alderman John Miles, J.P., of Bolton, passed away on the 5th inst., at his residence, "Lyndene," Heaton. For some time past, his health had occasioned anxiety; and eventually the end came from heart failure. By many friends in the industry, to whom he was well known through his regular attendance at the meetings of the Institution of Gas Engineers—his membership extended over fifty years—as well as owing to the interest in gas matters evinced by him in other ways (and to older members of the profession, of course, as a gas manager), his death will be much regretted; and sincere sympathy will be felt with the widow and family in their loss.

Alderman Miles was, as it were, born into the gas profession; for throughout his life his father, Mr. William Miles, was engaged in the management of gas-works—first at Blackburn (where Alderman Miles was himself born), subsequently at Great Grimsby, Market Rasen, Tyldesley, and Clitheroe. In the last-named town, he managed the gas-works for thirty years—from 1866 onwards. On leaving school, the son joined his father at the Tyldesley Gas-Works, in the management of which he eventually succeeded him. He remained there until 1869, when he transferred his services to the Rochdale Corporation; but a year later he went to Bolton, to take part in an india-rubber and steam-engine packing business. Of this business he eventually became sole proprietor. Other commercial undertakings with which he was connected, readers of the "JOURNAL" need hardly be reminded, included Meters Limited, of which he was Chairman.

Soon after taking up residence in Bolton, he entered the public life of the town, and occupied a seat in the Council uninterruptedly for a period of over forty years. After two years' service as a member of the Gas and Lighting Committee, he was made Vice-Chairman; and in 1887 he succeeded Alderman Moscrop as Chairman of the Gas Committee, which position he retained for many years. On his initiative the deposit system was abolished, except in special cases, and the use of prepayment meters was encouraged. When he retired from the department, his loss was much felt; the employees showing their appreciation of his work by presenting him with a portrait in oils and a handsome service of silver plate. For several years, also, he was Chairman of the Electricity Committee, and was twice Mayor—the second occasion being in the Coronation year of King Edward VII., when he represented Bolton at the State celebrations in London. From 1903 until the time of his death he was Chairman of the Tramways Committee—the last meeting attended by him being as recently as three weeks ago.

Many other public positions were held by Alderman Miles, who was also an earnest Mason and a capable musician. For more than fifty years he was Organist and Choirmaster of the parish church at Deane. At the end of 1888, he was placed on the Commission of Peace for the borough.

Mr. G. S. KENDALL, the Gas Engineer and Manager to the Stratford-on-Avon Corporation, who for the past three months had been away from duty owing to ill-health, died last Sunday week. In April, 1916, when Mr. J. S. Cranmer retired from the position, and was made Consultant Manager, Mr. Kendall (who had previously acted as his Assistant) was appointed in his place. Before going to Stratford-on-Avon, Mr. Kendall occupied the position of Assistant Works Superintendent at Wolverhampton.

Mr. H. G. Warren, the London Agent and Secretary of the Danish Gas Company, has received official intimation that his youngest son, Second-Lieutenant ALAN JOHN WARREN, of the London Regiment, was killed in action on the 10th inst. Lieutenant Warren, who had not yet reached his twentieth year, was educated at King's College School, Wimbledon, and shortly after the outbreak of war joined the Surrey Yeomanry. Early in 1915 he was sent to Flanders, and later to Alexandria, *en route* for Salonika. He was, however, invalided home from Alexandria in December, 1915. Later he was gazetted to the 12th Company, London Regiment (Rangers), and returned to the front, where he remained up to the time of his death. His brother, REGINALD H. WARREN, who at the beginning of the war returned from Copenhagen to take service with the Colours, is in the Duke of Cornwall's Light Infantry.

CITY AND GUILDS EXAMINATION PASSES.

THE subjoined further names may be noted of successful candidates in the recent City and Guilds of London Institute gas examinations.

Gas Engineering.

FINAL GRADE—FIRST CLASS.

L. F. King, Huddersfield.
C. W. Surman, Maidstone.
J. P. Thompson, Barnoldswick.

GRADE I.—FIRST CLASS.

S. B. Dean, Longwood.
J. E. Nicholls, East Ham.

GRADE I.—SECOND CLASS.

E. Brown, Longwood.
P. Marsland, Longwood.

Gas-Fitting.

GRADE I.

E. Brown, Longwood.
S. B. Dean, Longwood.
P. Marsland, Longwood.

Gas Supply.

FINAL GRADE—FIRST CLASS.

J. M'Lusky, Huddersfield.
J. P. Thompson, Barnoldswick.

FINAL GRADE—SECOND CLASS.

G. G. Buttery.
L. F. King, Huddersfield.
R. J. Lacy.
F. E. Lawson.
L. V. Stanton.

GRADE I.—FIRST CLASS.

S. B. Dean, Longwood.
P. Marsland, Longwood.
William Tufft.

GRADE I.—SECOND CLASS.

E. Brown, Longwood.

GAS EXAMINATION PRIZE WINNERS.

Awards by the Society of British Gas Industries.

THE Secretary of the Society of British Gas Industries (Mr. Arthur L. Griffith) forwards the following list of winners of the prizes given by the Society in the City and Guilds of London Institute's recent examinations in "Gas Engineering," "Gas Supply," and "Gas-Fitting" (Honours Grades).

GAS ENGINEERING.

First Prize, Final Examination, £3 3s.	Michael Barash, 8, Norfolk Street, Bury New Road, Manchester.
Second Prize, Final Examination, £2 2s.	John Robinson Hollies, 21, Heathcote Street, Kidsgrove, Staffs.

GAS SUPPLY.

First Prize, Final Examination, £3 3s.	John Bradbury, Bridge Street, Whaley Bridge, near Stockport.
Second Prize, Final Examination, £2 2s.	Jack Powell Thompson, 46, Shipton Road, Barnoldswick.

GAS-FITTING.

Final Examination.	The first prize was not awarded.
Second Prize, £2 2s.	William George Wright, 14, Cliff Street, Liverpool, passed first.

Illuminating Engineering Society of America.—The Council after careful consideration, have decided to follow the course taken by other societies, and have abandoned all plans for the annual convention of the American Illuminating Engineering Society, which was to have been held in Newark (N.J.) during September. This action was taken in view of the fact that the resources of the Society, both in personnel and finance, should be conserved to meet any emergency demand that might arise because of the war. The Executive Committee were authorized to consider the advisability of holding a short meeting to deal with questions of illuminating engineering having a bearing on the war situation. The Committee on Papers will complete arrangements with the authors of convention papers, as though the convention were to be held. It is proposed to circulate these papers, to obtain written discussions on them, and to publish both papers and discussions in the "Transactions."

THE SLIDING-SCALE AND THE BOSTON (U.S.A.) GAS COMPANY.

System has not Gained Favour in the Sight of the Commissioners.

TOWARDS the end of the volume comprising the thirty-second annual report of the Board of Gas and Electric Light Commissioners of Massachusetts for 1916, several pages are devoted to an investigation of the conditions surrounding the application of the sliding-scale system to the Boston Consolidated Gas Company, in connection with which it has been in operation some nine-and-a-half years. So far as the Board is informed, it is still the sole instance in the United States in which this particular system of regulation has been tried. Passing over the work associated with the preliminary investigation, we come to a section of the report headed

OPERATION AND EFFECT OF THE SLIDING-SCALE.

The report here says: The avowed purpose of the sliding-scale is to increase the incentives to economical and skilful management by the prospect of a definite and assured increase in dividends, and the public reaps the advantage thereby in prices decreasing correspondingly with an improvement in operating costs. It is urged on behalf of the Company that this has been its actual result. There has been unquestionably a decrease in the net cost at the burner of the gas sold during the period, due to the enterprise and commercial skill of the management. But the same is true of companies not under the sliding-scale, and is attributable to a greatly increased output without any corresponding increase in actual expenses. Undoubtedly, reductions in price have contributed to this result.

At the time when the Act took effect, the Company was producing in the old works already described such gas as it did not purchase. They were not then economical to operate; and the cost of producing gas was immediately reduced when concentrated in the new water-gas works at Everett. The cost has varried since, chiefly with the price of oil. But in addition to the expense of operating and maintaining such works, the computed costs include about ½ c. for the care of the old works when not making gas, although this would seem fairly a part of the cost of the purchased gas. Furthermore, gas purchased by the Consolidated Company from the Gas and Coke Company is taken at a uniform rate throughout the year, while the gas produced by the Consolidated Company supplements this supply, and varies in amount with the season of the year. This condition of uniformity of production operates favourably upon the unit costs to the Gas and Coke Company of the gas bought by the Consolidated Company, but unfavourably upon the unit costs to the latter Company of the gas made in its own works. There has been substantially no change in the cost in the holder of the gas purchased. Indeed, there has been an increase of approximately 1 c. when compared with the year ended June 30, 1906. This introduces a most important question directly affecting the operation of the sliding-scale as an effective means of regulation under existing conditions. The cost of coal gas is intimately related to the amount and value of the residuals recovered. The residuals must be disposed of in an open market. Consequently, no other department of the gas business presents an opportunity for a greater display of business skill and sagacity with a direct reflection in decreased costs. But, by reason of the existing conditions, the management of the Boston Company has no chance to apply skill and sagacity to its solution for the benefit of the Company. Because of the common ownership of the Boston and the Gas and Coke Companies, it has no opportunity to exhibit even shrewdness in the making of a contract for the purchase of gas upon the terms most favourable to the Boston Company.

The answer will doubtless be made that the price paid must be approved by the Board. This is true; but it is to be borne in mind that, by the terms of the Charter, the authority of the Board is limited to finding "that the price to be paid for the gas purchased is less than it would cost said Boston Consolidated Gas Company to make its gas in gas-works of standard type properly equipped, suitably situated, and of sufficient capacity to make all the gas required by the whole district supplied by the Company." It is comparatively easy to determine the production cost at works fulfilling the above requirements; but it is by no means easy to fix the standards for the recovery and marketing of a large output of bye-products. Even if the Charter of the Consolidated Company permitted this test, there is no way of determining with any accuracy the cost to the Gas and Coke Company of the gas sold to the former Company.

The Charter provision quoted was enacted in 1903 (long before the sliding-scale was thought of), and was suggested undoubtedly as a safeguard because of the known common ownership of the two concerns, and its possible use in exacting an unfair profit. Its inconsistency with a system of regulation dependent solely upon the self-interest of the Boston Company did not become apparent until the managers of that Company raised the price received by the Gas and Coke Company, to the latter's unquestionable advantage, justifying the new price on the ground that it was not greater than the demonstrable cost of making it "in gas-works of standard type," &c., including, of course, the investment charges on such works and taking into account the hazards of a market already saturated with the coke made in the gas and coke plant.

The Board has also called attention to another important phase of the Company's policy—namely, the manifest tendency towards the exhaustion of its resources through the payment of dividends not fully earned, and without any adequate provision whatsoever for depreciation. The disastrous results of such a policy, if long continued, need not be dwelt upon. An obvious answer, and one given by the Company, is that the reductions in price were, in the light of experience, made too promptly and in anticipation of savings in cost and attendant advantages. It was urged, moreover, that, without the incentives of the sliding-scale, costs "would not have been reduced to the extent to which they have been reduced," nor would the Company have anticipated such savings in costs, and reduced prices in advance of them. But it was also stated that "the incentive of the sliding-scale is first felt by the financial managers of the Company; they want more dividends." Dividends are, however, not fixed charges. They are not required to be paid even if permitted, and certainly should not be, if not earned. But if the immediate rewards, both direct and indirect, of this incentive are more important to the management than the permanent soundness of the investment, then the permitted dividends may be taken under the Act with an apparent immediate public advantage, whatever its ultimate effect, but without consulting that other member of the partnership as to which policy is in the long run in its best interest.

The Board ask that they should not be misunderstood. To be sure, a similar financial policy may be pursued by a company not under the sliding-scale, and perhaps without the accompanying immediate advantage of lower prices to the public. On the other hand, the self-interest upon which the sliding-scale as a system of regulation is founded, and a far-seeing, conservative financial policy should be identical. But where this relation has not been maintained, suspicion is aroused that the interests of the Company may have been subordinated to the needs of the holding "association," with its large issues of securities based primarily on the gas supply of Boston, and the freedom of action that is afforded by the sliding-scale has aided this result.

One of the strong advocates of the sliding-scale at the time of its adoption urged at the recent hearings with great force that the sliding-scale has taken the Company out of politics. No one will deny the importance of this result. But the scandals of the gas situation prior to the adoption of the sliding-scale appear to have been due more to the struggle of powerful interests for control than to the resistance of the Company to political attacks, or even to public insistence upon lower prices. The praiseworthy change in the attitude of the Company towards the public under the present management, to which allusion has already been made, has had an important effect upon its public relations, and would doubtless have been pursued with a similar result whether the sliding-scale had been adopted or not.

The Boston Company was the first in this State to reduce its price to 80 c. Its example unquestionably had a substantial influence upon the prices charged elsewhere. Its promptness in making its reduction, moreover, was perhaps due to a feeling of greater security in the pursuit of a definite policy because of the sliding-scale. But the fact that several of the other companies not under the sliding-scale have meantime reached this price, all (save two) voluntarily, and two others even 75 c., makes it evident that the sliding-scale has been no more effective this end than the system of regulation applicable to all other companies.

CONCLUSIONS AND RECOMMENDATIONS.

No fair-minded person is disposed to question the theoretical soundness of the principle claimed for the sliding-scale as applicable to all public service corporations—viz., that decreased cost and increased profits, due to skilful and wise management, shall be shared in lower prices to the public and larger dividends to stockholders. This has been, in fact, a policy recognized and pursued by the Board for many years in dealing with questions of rates. But its conversion from a working theory into a fixed rule, expressed in any given case in the interrelation of a standard dividend with a standard price, may be quite another matter. Of necessity, such a system must project indefinitely upon the future the known conditions at the time of its adoption, and its operation must be left almost wholly to the initiative of the company. Where the choice is open, it is a serious question whether it offers in the long run any substantial advantage to the public, or even to the companies, over the system of regulation so long pursued in the Commonwealth. Its vogue in England is due, in considerable measure at least, to the fact that direct interference with gas prices is virtually unknown there, and that it is the alternative to the maximum dividend method of control under which a company is permitted to earn the maximum dividend and no more. But it is worthy of notice that, under the present desperate national stress, the sliding-scale companies appear to be under distinctly adverse conditions as compared with the maximum-dividend companies; and whether or not in the light of this experience maximum-dividend companies are as likely to go under the sliding-scale hereafter may be open to doubt.

This system of regulation for the Boston Company was deliberately adopted ten years ago, after an elaborate investigation and with the earnest support of a number of individuals who disinterestedly believed it to be in the public interest. The Board has not felt called upon to enter upon this inquiry as though the question were entirely novel, but rather as to whether the system has so failed to fulfil its promise as to warrant its repeal. Upon certain features of this problem, opinions may differ; but one thing is clear, that the trading relations with the affiliated companies of the

Massachusetts Gas Association, forced upon the Boston Company by their common ownership, are inconsistent with the purpose and theory of the sliding-scale as a scheme of regulation. If profits can reach the stockholders of a gas company under the sliding-scale by any other means than through its dividends, the basis of control is impaired, if not wholly destroyed.

It is immaterial to the owners of the securities of the Association whether the dividends which reach them come from the profits of the Gas Company or the Gas and Coke Company; but it is of vital importance to the consumer that, if his sole reliance for lower prices rests upon the incentives of the sliding-scale, no profits on the gas which he consumes shall be distributed save through the dividends of the Gas Company. Moreover, with a holding Association superimposed between the Gas Company and the investors, the essential feature of the sliding-scale system of regulation—namely, the sale of additional stock at auction—has been, and will probably always be, inoperative.

There is, in fact, reason to believe that, under the conditions which have existed, the sliding-scale has not had a fair trial; and, in the light of the experience of these ten years, there is no promise of any further reductions in price under it so long as the present relations with the other companies affiliated under the Association are maintained. Furthermore, the evils commonly attendant upon the control of public service corporations by holding associations are by no means diminished by the sliding-scale, and are destructive of any sound system of regulation which should safeguard the resources of the corporations under supervision in the interests of consumer and investor alike. Otherwise they may at the last, through the dissipation of their resources, become so enfeebled as to forbid any hope of adequate service at low prices.

In view of these considerations, the Board are of the opinion, and recommend, that the Act shall be repealed unless the Boston Company is entirely disassociated from the Massachusetts Gas Companies and its stock distributed directly among investors. If this is done, a few years of further experience should develop conclusively the relative advantages and disadvantages of this system of public regulation.

If the Act be continued on such terms, two other matters should be dealt with incidentally. The present Act permits a revision of the standard price after July 1, 1916, but only upon petition of the Company or the mayor of a city or select men of a town supplied. In the judgment of the Board, the consumers should not have their rights depend solely on the initiative of these officials, but should have the power to invoke directly the Board's authority in the matter. This section is also silent as to how frequently such revisions may be made; and it seems fair, if reliance is to be placed upon the sliding-scale system, that there should be reasonable intervals between such revisions. In earlier parts of this report it has appeared that the Company is in a measure embarrassed by its relatively large capital as compared with other companies of the State, because of a correspondingly high dividend charge. If its stock were now independently owned it would be in the interests not only of its stockholders, but of the public, that additional issues of stock entitled to share in the benefit of permissible increases in dividends should be kept at a minimum. In the English practice, the debenture and preferred stocks do not enjoy the right to the sliding-scale dividends; and yet a substantial proportion of the capital raised is by the issue of this class of securities. This, in the opinion of the Board, should be made a feature of the Boston Act.

The Board have also been directed to report their recommendations as to the "extension of the system." By this phrase, the Board understand the Legislature to mean the application of the system to companies other than the Boston Company. The East Boston, Newton and Watertown, and Quincy Companies are integral parts of one system, already physically united and interdependent, and kept apart legally merely by the accident of their early corporate existence. The same is equally true of the Dedham and Hyde Park Company, save that it is quite independently owned, and its situation is far more grievous, especially to the consumers of Hyde Park, which is now part of Boston, but does not enjoy the full benefit of that relationship. These Companies should be merged with the Boston Company, but not until the communities served are fully apprised that this step means that, unless the Sliding Scale Act is repealed, such merger involves virtually their inclusion under this system of regulation. This is a matter, however, requiring no new legislation.

So far as the other gas companies of the State are concerned, no demand for the extension of the system to them developed in the course of the Board's investigation. Indeed, it was stated, on behalf of certain of them, that they did not desire it unless upon the basis—proposed several years ago and denied by the Legislature—of capitalizing the full value of their properties by the issue of additional stock. The Board opposed this move when it was made, and have seen no reason to modify its views. Moreover, investigation has not discovered any such positive advantages in the sliding-scale system of regulation over that still prevailing with respect to the other companies as to justify its substitution. The Board recommend that it is inexpedient to extend the sliding-scale to other gas companies of the Commonwealth.

In conclusion, the Board recommended the passing of "An Act Relating to the Boston Consolidated Gas Company."

SECTION 1.—Chapter 422 of the Acts of the year 1906 shall become void on the 1st day of July in the year 1917, unless the Boston Consolidated Gas Company shall meantime have satisfied the Board of Gas and Electric Light Commissioners, and said Board shall have certified to the Secretary of the Commonwealth that the trustees of the voluntary association, known as the Massachusetts Gas Companies, no longer own or control, directly or indirectly, a majority of the capital stock of the said Company, and that no other voluntary association, or the trustees thereof under a written instrument or written or oral delaration of trust the beneficial interest under which is divided into transferable certificates of participation or shares, own or control, directly or indirectly, a majority of the capital stock of the Company.

SECTION 2.—The provisions of sections 1 and 2 of Chapter 422 of the Acts of the year 1906, relative to the standard rate of dividends to be paid by the Boston Consolidated Gas Company, and the increase in the dividends therein authorized, shall not apply to any preferred, special, or employees stock which may hereafter be issued in accordance with the requirements of law relating thereto.

SECTION 3.—Section 9 of Chapter 422 of the Acts of the year 1906 is hereby amended, so as to read as follows: Section 9. At any time after the expiration of ten years from the 30th day of June, in the year 1906, the Board of Gas and Electric Light Commissioners shall have authority, upon the petition of the Company, or upon the petition of the mayor of any city or the select men of any town in which the Company is supplying gas to consumers, or upon the petition of not less than twenty of the consumers, to lower or raise the standard price per 1000 c.ft. to such extent as may justly be required by reason of greater or less burdens which may be imposed upon the Company, by reason of improved methods in the art of manufacture, by reason of changes in the prices of material and labour, or by reason of changes in other conditions affecting the general cost of the manufacture or distribution of gas. But, after a decision upon such a petition, no other petition shall be brought hereunder within three years thereafter.

SECTION 4.—This Act shall take effect upon its passage.

COAL SUPPLY IN SCOTLAND.

Regulations by the Coal Controller.

[From a Scottish Correspondent.]

THE effect of the new coal supply regulations upon gas-works in Scotland, except for one important area, may be regarded as generally satisfactory. When it is remembered that three of the areas produce, each in themselves, a considerable number as well as variety of good gas coals, it may be taken that the gas-works therein situated will not seriously be affected, and that they are likely to be allowed to continue to use the same class, if perhaps not the actual same coal, as before.

The South-Eastern area (the Border district), embraces Galashiels, Hawick, and the Granton works of the Edinburgh and Leith Gas Corporation. These works will draw upon the Lothian coalfields, as at present; and it is understood that gas-works in this area draw only very slightly from Fifeshire and Lanarkshire. To them, therefore, the new regulations do not present any serious interference. The South-Western area, which includes Largs, Kilmarnock, Ayr, Dumfries, &c., will draw their supplies from the Ayrshire coalfields, as they do at present to a very large extent; any coal drawn from Lanarkshire in the past being a comparatively small amount.

The North-Western area [No. 18] comprises by far the maximum number of gas-works in Scotland. They are also the larger in point of size, and include Glasgow, Paisley, Coatbridge, Hamilton, Motherwell, and a number of other fairly considerable works. These works are fortunate in being situated in the midst of the best gas coal producing area in Scotland, from which they have hitherto been in the habit of drawing their entire supplies. It is true the Glasgow Corporation have during several recent years drawn upon Fife, but chiefly perhaps in order to maintain supplies; and it is understood that the contracts recently fixed have placed the whole requirements from Lanarkshire. Paisley takes about one-third of its requirements from Ayrshire; and to this extent it will be affected.

The North-Eastern area is undoubtedly the district which presents the greatest difficulty and objection to the regulations of the Coal Controller from the point of view of the gas manager. This area embraces all the gas-works immediately north of the Forth, and it is laid down that these works are to be provided with gas and coking coal from their own area, which is the Fife coalfield. It is well known that Fife coals are poor for gas-works purposes; and from actual experience the writer is able to state that coals from this area yield from 1000 to 1500 c.ft. less gas per ton, only about 18 to 22 lbs. of sulphate of ammonia, less tar, and a coke that is distinctly inferior. With only three exceptions known to the writer, Fife coals have never been attractive for gas-works use. This is due largely to the fact that they belong to the non-coking class. It can be shown that if gas-works are required to draw from Fife, and to take Aberdeen and Dundee as examples, that the extra quantity of coal to be conveyed in wagons on the railways will amount to about 15 p.ct. This extra quantity is considerable when it is remembered that Aberdeen and Dundee each consume about 120,000 tons of coal annually, and that the aggregate requirements of all the other gas-works in the same area exceed this amount. Evidence of the non-suitability of Fife coals for gas-works purposes is found in the fact that

hitherto coal from this area has gone very largely for shipment. Gas-works have taken only the minimum quantity of Fife coal; and the writer learns that, in the case of quite a number of works, no coal from Fife has been used for many years. The Dundee and Aberdeen Gas-Works, as the largest users north of the Forth, have taken only about 5 p.ct. of their total requirements. This is entirely due to the non-suitability of Fife coals for gas making, notwithstanding its nearer proximity. It has been remarked that Fife coals are non-coking; and in the case of three large works where stoking machinery is in operation, it would be an absolute impossibility to use Fife coal having regard to the difficulty of pushing out the coke. Where coke-pushers are in operation, it is necessary to use at least a large proportion of coking coal, and it is not practicable to employ the machines successfully with the poorer quality of coke from Fife coals.

At the Perth Gas-Works all the retorts are horizontal, machine charged and discharged. Perth will require to be served with a large proportion of good coking coals; and these are not obtainable to a sufficient extent in the area defined by the Controller as the source of coal for Perth. The Stirling Gas-Works are peculiarly situated, as hitherto they have drawn their supplies from Bannockburn, only a few miles away; while according to regulations, supplies must now come from Fife—a much greater distance. A machine pusher is in use at Stirling; and here also coking coals must largely be used. It cannot be too largely emphasized that Fife coals are generally useless where stoking machinery is in use, because of the small coke produced—sometimes largely made up of breeze, thus leading to danger of bursting the retorts with the pusher. It is evident the cases of Perth and Stirling—and there may be others elsewhere—call for exemption to some extent.

The Coal Controller is prepared to give preference to coke-ovens, gas-producers, and automatic stokers, when certain special descriptions and qualities of coal are required for certain purposes. It is hoped that the necessary diversion of supplies of coal will be made to gas-works north of the Forth. In this regard the Coal Controller will, it is hoped, give due weight to the fact that gas-works are themselves the means of saving tonnage over the railways, having regard to the fact that half the weight of coal used in gas-works is sold in the form of coke to consumers of fuel locally. Further, the extent to which gas is employed for household requirements and for munitions and manufacturing purposes, means a great saving in the use of solid fuel, and, therefore, saving of carriage on the railways.

Mr. Bamford, from the Coal Controller's Department, London, along with Mr. Thomas Glover, met in Glasgow last Wednesday a number of managers of gas-works most affected by the new regulations. These gentlemen also met the Council of the North British Association in the afternoon. The whole position was fully gone into and carefully reviewed; and it is learned that, in those cases where there is distinct and strong evidence of the unsuitability of coals for particular gas-works, sanction is likely to be given to draw upon the restricted areas for at least a percentage of the total requirements. The London representative was strongly impressed with the evidence laid before him.

The District Coal and Coke Supplies Committee should have at least one representative from the gas industry in Scotland whose local knowledge of the coal suitable for gas making from the several areas, as well as his knowledge of the particular requirements of gas-works (these are strikingly exceptional in a few instances) would be a matter of simple justice. At present, the Committee in Glasgow is composed entirely of coalowners, who do not presume to know much of the needs of gas-works as an individual industry for particular qualities of coal. The need for such a representative is seen in the fact that north of the Forth the two largest consumers of coal are Dundee and Aberdeen Gas-Works, and that of necessity, both these works for almost all time in the past have derived their major supply of coal from the Lothians and Lanarkshire; and that Fife, while much nearer, has been almost entirely neglected as a source of coal supply.

The Coal Controller, it is evident, has not been served with sufficient data of an accurate and reliable kind as regards the quality of coal used in the gas industry—at least, as regards the quantity and quality of Fife coals suitable for gas-works north of the Forth. It was strongly asserted to the Controller's representative and Mr. Glover that the quantity of gas coal in Fife is far short of that needed for the area defined, and that grave miscalculation had been made in assuming that the North-Eastern area could find all its gas coal in Fife. The representative stated to the meeting that Mr. Calthrop had already taken steps to appoint an outside member (who would be neutral) to the District Coal and Coke Supplies Committee. The opinion was strongly expressed that this was not sufficient. Experience had shown that the coalowners who formed this Committee, as sellers of coal, could not be expected to deal satisfactorily with supplies, and that the users of coal should be represented. The representative stated that he would put these views strongly before Mr. Calthrop. Mr. Glover said that he was anxious to co-opt for his own assistance a Scottish gas engineer to advise him as to the particular position of gas-works supplies of coal in Scotland. This appointment will be welcomed.

A contribution of ten guineas has been voted by the Institution of Gas Engineers to the Board of Scientific Societies, of which the Institution is a "constituent society."

ELECTRICITY SUPPLY MEMORANDA.

A sensible article (with one or two side-issue exceptions) which invites the electrical industry, the Board of Trade Electric Power Supply Committee, and all others concerned, to pause and to broaden their investigation of electrical affairs, appears under the title of "Pipe Lines *v.* Pole Lines" in the "Electrical Times." The author signs himself "D.V.M." The inquiry into the cheapening of electric power supply threatens to narrow itself down, through the steering power of the electrical enthusiasts on the Departmental Committee, to large generating plant concentrations, with existing interests in opposition, all struggling to defend their own particular allotments in the electrical field. The position that "D.V.M." takes, "Meteor" (with wisdom reigning) puts crisply: "If we are right in laying down a small number of superstations, let the work go ahead by all means. But first let us be absolutely sure that there is no considerable risk of the whole system becoming obsolete as the present one has done." In the electrical world, it is generally thought that the electrical engineer is his own best specialist; but "D.V.M." frankly confesses that he is not averse to letting the non-electrical engineer have his say. The electrical engineer is not omniscient any more than other engineers; but, as we have before said, when a revolution in practice is contemplated, it is just as well to assure oneself that the lines that it is proposed to take are the right ones, and the ones that will contribute the maximum to national economy. "It is essential," remarks "D.V.M.," that the non-electrical engineer should have his say, "if only for the ultimate benefit of the electric supply industry, since any rashness born of undue enthusiasm in electrical transmission would undoubtedly lead to a set-back." Unusual electrical prudence is shown here.

External Advice.

"D.V.M." lets a bomb drop in electrical circles. Suppose an engineer could show that capital and running charges were less on a line of pipes conveying fuel than on a line of cables conveying electrical energy. The supposition is heretical; put into print, it is worse. But he salves the wound. Of course, the lower charges of the pipe-line would not demolish the electrical paradise, "since all light, power, and heat should be conveyed to the consumer electrically in any case; coal or gas burning on private premises being dangerous and unsanitary." The proposition and allegation are both dressed in a diaphanous garb of falsity, which does not really deceive even the central station engineer, who wishes devoutly there was more solid truth about it. The writer proceeds to soundly rate those electrical engineers who assume that, in all cases and conditions, electricity is necessarily, and beyond question, a proper medium for long-distance transport. At the pit mouth there is no certainty of finding water for condensing purposes. It might be possible to transmit coal to the nearest river; there construct the generating plant; and thence transmit the electrical energy. But that is not the same thing as producing and sending the current direct from the source of fuel supply. He thinks of pipe-lines; and the very fineness of the subdivision of coal to-day "gives furiously to think." There is something here staring the electrical engineer in the face. We take it "D.V.M." has visions of coal dust conveyance by air pressure; and in our minds we conceive some ugly blockings and intermittent supplies. It may also give him "furiously to think" when he is reminded that the reduction of coal to dust for storage purposes brings it into a condition conducive to more expeditious oxidation—so promoting with greater rapidity the conditions necessary for spontaneous combustion. Gas, he imagines, "might demand too big an outlay in pipes. But much depends on the degree of compression possible." He should study the linear characteristics of American pipe-lines for natural gas, their carrying capacities, and the pressures used. At best, the electrical superstation would only put on to the wires a small percentage—our friend says 20, but we would halve the figure under exceptionally good circumstances—of the original thermal value of the coal; and there are the subsequent transforming and transmission losses. The prospect does not look inviting regarded from the platform of economy. There may be more in the pipe-line yet than the pole-line. It may even be that it will be cheaper to carry the concentrated riches of coal as now, and have its different products divided-up at the localities where they are wanted. Otherwise, there will have to be distribution systems radiating from the pit heads all over the country for electricity, for gas, for coke, for tar (crude and refined), for the light oils, for sulphate of ammonia, and all else. There may yet be a proved economy in the railway coal wagon over concentrations which, like the Zeppelins, make good targets, and which would mean huge expense in distribution and in the provision of plant and cables in excess of requirement in order to ensure continuity of supply. It is no limited inquiry that should take place by the Departmental Committee now sitting at the Board of Trade.

Pipe-Lines v. Pole-Lines.

The Electric Power Supply Committee of the Board of Trade must acknowledge that in the electricity supply industry it is the best hated of all institutions. But the funny part of the matter is that, instead of the industry

The Ruling Discontent.

compelling the Board of Trade to dissolve the Committee, and (if one is really wanted) set up another of approved composition, by declining to give evidence before this one, the various organizations are preening their feathers and preparing to make the best possible show before the Committee, knowing all the time that confidence in any real good coming out of it is at a very low level. The agitation for additional representatives of municipal undertakings resulted, as mentioned last week, in the appointment of Mr. Harold Dickinson, the Electrical Engineer of Liverpool, Bailie Smith, of Glasgow, and Mr. Vesey Knox, K.C. The two latter appointments have only irritated the recalcitrants. The "Electrical Times" thinks that politics and string-pulling are now at their crisis; and that there may be more news to record shortly. "Electrical Industries" submits that "the Board of Trade must realize that nobody has any confidence in the present Committee. . . . The best thing to do is to scrap it, and replace it by a body of leading industrialists who have no concern with vested interests." To the "Electrician" it seems a mistake to add to the Committee further members having mainly the qualifications of City Councillors or King's Counsel, however eminent, when there are available many municipal engineers of great experience. So the tide of discontent and suspicion flows over this ill-favoured creation of the Board of Trade.

Not the Way to Coal Economy.

The Coal Controller is either a diplomatic man or he is fond of a little joke. When addressing the Incorporated Municipal Electrical Association recently, although he told the members that he was not a technical man other than in railway matters, he said he believed electrical undertakings represented the most efficient coal users in the country. That was the same meeting at which the members were debating how they could relieve themselves of the obloquy of being among the most prodigal of coal users; and consequently there was justification in the editorial remark in the "JOURNAL" for July 3 [p. 12] that "the electrical engineers present must have been mightily tickled over this, as there flashed across their minds the data as to the amount of thermal value that goes into their boiler furnaces, and the resultant exiguous thermal value that is available at the consumers' terminals." Since then the Coal Controller has issued a number of suggestions [*ante*, p. 75] which represent the advice tendered to him whereby "economy in the use of coal can be effected and much inconvenience avoided" in the matter of coal supply "during the next and succeeding winters." There are only a couple of criticisms to be made. The first refers to the suggestion "that the various factory owners throughout the country who at present generate their own power by means of coal, should make arrangements for taking their power requirements from an outside source in districts where the power supplies have a margin available." This altogether depends on the circumstances of the locality. For instance, it is calculated that the average consumption of coal per unit by town electricity supply stations in this country is approximately 4½ lbs., which means 3·375 lbs. per horse-power-hour. Some stations run up to several pounds' coal consumption per unit generated; there are very few that are much below 3 lbs. per unit. Transfer from private power plants to a public supply to effect coal economy depends in the case of electricity, first, upon the consumption of the generating stations; and, secondly, upon the fuel used by the private owner of plant. It may be fuel from the local gas-works, which utilizes a ton of coal with a thermal efficiency unapproached by any other users. The second suggestion for criticism is "the installation of gas or electric cooking and heating appliances in public and private buildings, with a view to saving coal generally." Now, whoever advised the Coal Controller regarding the substitution of electricity for coal in order to effect economy of the latter ought to be put under thorough examination in his presence. We will suggest a line. Suppose the coal used has a calorific value of 14,500 B.Th.U. per lb., this would mean for the average consumption of 4½ lbs. of coal per unit of electricity generated 65,250 B.Th.U. Assume the coal grate has only 20 p.ct. efficiency, this would mean that, if the 4½ lbs. of coal were utilized in the coal grate, there would be delivered into the room 13,050 B.Th.U. Let us further suppose that the electric heating appliances used have 100 p.ct. efficiency, which they have not, and that the whole 3420 B.Th.U. were delivered into the room, the consumer stands to lose nearly 10,000 B.Th.U. by transferring from coal to electric heating. To get the equivalent 13,050 B.Th.U. delivered into his room through the medium of electricity, he would have to use nearly 4 units of electricity (still assuming 100 p.ct. efficiency for the electric appliances), which, on the average of 4½ lbs. consumption per unit at the central station, would mean nearly 18 lbs. of coal consumed there, against 4½ lbs. in the coal grate. There is something here which should interest the Coal Controller.

Limitations of the Electric Furnace.

It is the opinion of Mr. C. F. Hirshfeld, Chief of the Research Department of the Detroit Edison Company, that in a general sense, the electric-furnace cannot be considered as a commercial competitor of furnaces heated by combustion. The use of the electric-furnace must make possible the attainment of something unattainable by combustion methods, or else there is no possibility of its being used in place of the older type, excepting perhaps under very unusual conditions as to the relative costs of fuel and electrical energy. This expression of opinion is found in a paper before the American Electro-Chemical Society. But there is the qualifying statement that there are certain low-temperature processes—below about 290° C. (554° Fahr.)—which, under certain circumstances, can be conducted to better commercial advantage by means of electric heating than was possible by means of combustion heating. Such low temperatures are common in numerous baking and drying operations. During recent years, the use of electric heating where low temperatures are required, has been adopted in cases calling for the installation of equipments with capacities ranging from several hundred to several thousand kilowatts. Mr. Hirshfeld instances japanning work; and the makers of gas-furnaces for this purpose should consider his submissions. Photomicrographs, he says, show that, in baking japan slowly in a direct-fired gas-oven, small craters were formed, which "seem to be typical of all baking methods in which the heating is done by means of hot gases bathing the work." On the other hand, work done in the electric-furnace shows smaller and more evenly distributed craters. A saving of time is also claimed for the electric-furnace—the baking of three coats in a gas-oven taking five-and-a-half hours, against two hours and forty minutes in an electric-oven. Mr. Hirshfeld believes that for this work radiant energy is preferable to convected heat, in that it causes a more rapid setting of the inner portion of the coat. Experiments satisfy him that samples baked by convected heat had the poorest surfaces, while those baked by internal heating have the highest gloss and most perfect surfaces. With internal heating, a maximum metal temperature of the order of 170° C. (338° Fahr.) and a bake of fifteen minutes were found capable of giving better results than could be obtained with internal electric heating. *Primâ facie* internal heating seems the correct method in order to get the base of the coating to set first; but if radiant heating has the same effect, why not the surface combustion gas method? In this connection, reminder may be given of the comparisons made—also at Detroit—of gas and electric japanning ovens, as referred to in the "JOURNAL" for Dec. 26 last [p. 639]. It was then stated that, "under the most favourable conditions, the operating cost of an electric-oven is at least twice that of gas in any place in Detroit, and, under less favourable conditions, the cost may be four or five times that of gas per bake."

INSTITUTION OF GAS ENGINEERS.

Council Meeting.

A Meeting of the Council of the Institution of Gas Engineers was held on the 5th inst.—the President (the Right Hon. Lord Moulton, K.C.B., F.R.S.) in the chair.

Among other business transacted, Mr. Broadberry reported an interview he had had (as representative of the Institution) with representatives of the Institution of Heating and Ventilating Engineers on the subject of the unification of symbols and abbreviations used in the science and practice of heating and ventilation. While it was felt that the present time is not suitable for coming to any decision on so important a matter, it was agreed —provided the proposals are unanimously approved by other technical bodies—that the term "therm" should be adopted in place of B.Th.U. (British thermal unit) so as to distinguish it from the Board of Trade unit, and that the symbol ϑ should be employed to denote it. [See next page.]

The preliminary arrangements made by the Gas Components Committee for their research were reported. It was announced that offers of assistance in the research had been received from the South Suburban Gas Company and the Gas Department of the Birmingham Corporation.

Correspondence between the Institution and the Board of Trade with reference to the operation of water-gas plant was considered; and it was decided to issue a statement on the subject. [A copy of the statement appeared last week, p. 61.]

In response to a suggestion from the National Gas Council, representatives of the Institution were appointed to attend a conference to discuss the question of a proposed building.

A report was presented from the Chairman of the Demobilization Committee (Mr. R. G. Shadbolt), indicating the arrangements that had been made for dealing with any cases that may be brought under their notice.

A communication was received from the Wales and Monmouthshire District Institution suggesting the consideration of the subject of linking-up gas undertakings in a manner similar to that proposed by the electrical industry. The Council were informed that this matter is now receiving the attention of a Committee of the National Gas Council, who would in due course present a report upon it.

There will be no British Association meeting this year—that provisionally arranged for Bournemouth having been cancelled after consulting the Bournemouth authorities and His Majesty's Government. This will be the first time since 1831 that the Association has not been able to assemble. Sir Arthur Evans, the President of last year's Newcastle meeting, will remain in office, and Sir Charles Parsons will preside over the meeting to be held at Cardiff in 1918—at a date not yet fixed. The Bournemouth authorities have expressed the wish soon to entertain the Association; and the invitation has been accepted for 1919.

CARBONIZING RESULTS WITH GLOVER-WEST VERTICAL RETORTS AT MACCLESFIELD.

Make of Over 15,000 C.Ft. by Passing Steam through the Charges.

THE annual returns of the Macclesfield Corporation Gas-Works for the year ended March 31 last have aroused interest among gas engineers who are endeavouring to obtain increased efficiency from their carbonizing plants owing to the present high price and scarcity of coal and oil and increased labour costs. In response to the request of several engineers and a representative of the "JOURNAL," Mr. J. E. Blundell, the Corporation Gas Engineer, has kindly furnished particulars of the methods he has employed to obtain and maintain a further efficiency above the average of the results published in the last annual returns, which showed that the production per ton of coal was 12,930 c.ft. of gas of a calorific value of 533 B.Th.U. gross, with a yield of 12·7 gallons of tar, and 30·7 gallons of 10-oz. ammoniacal liquor.

The carbonizing plant at the Macclesfield Gas-Works consists of a Glover-West vertical retort plant of a nominal capacity of 1 million c.ft. per twenty-four hours, but capable of producing, by the methods now employed, an increase of at least 25 p.ct. by the manufacture *in situ* of a small quantity of water gas by the passing of steam through the charge in the retort. To meet the maximum demand which may arise for a short time during the winter months, there is on the works an independent plant for the manufacture of carburetted water gas, which plant since the beginning of the war has been but rarely used, owing to the shortage and cost of oil.

It was the intention of Mr. Blundell to place at our disposal a very complete set of analyses of the various products from different kinds of coal, with statistics showing rates and temperatures of carbonization, quantities of steam, and quality and quantity of coke made. But, on consideration, he has found that, with some further experiments, he will have sufficient data with which to compile a paper for reading at a meeting of gas engineers, where a discussion on the subject, if it elicited an expression of the experiences of other engineers who have carried out researches in the same direction, would make a valuable contribution to the subject of carbonization. For the present, we are able, by the permission of Mr. Blundell, to publish certain details of the results, with the hope that their publication will at once be useful to those who are searching to increase their output of gas while maintaining its quality, especially the calorific value. As regards the illuminating power, it should be noted that the process of washing the gas by tar to increase the toluol output is in operation at these works. Therefore, although the illuminating power is of an average of 11 to 12 candles (No. 2 "Metropolitan" burner), it would not be just to make comparisons under the existing conditions.

Mr. Blundell has, since the publication of the annual returns, which contain, during the latter period of the year, a larger yield than the average for the year, made further experiments to demonstrate what can be done towards increasing the efficiency of the carbonizing plant; and he submits two examples: In one he realized 15,500 c.ft. of gas per ton of coal, with a calorific value of 510 B.Th.U. gross; in the other, 15,200 c.ft. of gas per ton, with a calorific value of 508 B.Th.U. gross. During the months of April and May this year, the yield of tar was 15·7 gallons, and of 10-oz. ammoniacal liquor 33·35 gallons. These examples are the results of tests made to establish the correct method of applying suitable heat to the retorts—an important point.

In order to reduce the quantity of incombustible matter in the gas, it was necessary to arrange that, in heating the retorts, the highest temperature should be towards the lower end of the carbonizing portion of the retort. To do this the Glover-West system of heating the retorts by separate combustion chambers lends itself admirably to attain the desired temperature. A series of experiments showed that an improper distribution of the heat could easily give a gas with a high content of CO_2, which in properly heated chambers is converted into CO.

Steam is supplied from boilers working at a pressure of 100 lbs. per square inch and reduced to a pressure of from 5 to 10 lbs. in the coke-chambers, to each of which it was admitted through a nozzle of $\frac{1}{8}$ in. bore. The speed of extraction of the coke is reduced by about 10 p.ct.

Experiments have been made with a free space of larger volume than ordinary practice at the upper or outlet end of the retort. These show that an increase of heavy hydrocarbons in the gas is obtained, which indicates that it is possible the production of water gas within the retort may be still further increased without detriment to the calorific value.

The coal used during these experiments was a mixture of Yorkshire, Derbyshire, and Staffordshire coals, with an average volatile matter content of 36·9 p.ct. and ash 5·12 p.ct.

The exhauster, which is of the rotary type, maintains a vacuum at its inlet of 13-10ths to 14-10ths, giving a vacuum of 11-10ths at the outlet of the retort-house governor, which is set to maintain a constant inlet vacuum of about $\frac{1}{2}$-10th. This at the retort outlet would be a level gauge.

Mr. H. E. Riley, of St. Austell, has been appointed a member of the Refractory Materials Committee of the Institution of Gas Engineers.

PROPOSED UNIFICATION OF HEATING SYMBOLS.

As reported in another column, at the last Council meeting of the Institution of Gas Engineers, a suggestion emanating from the Institution of Heating and Ventilating Engineers was tentatively agreed to. This was incorporated in the following table issued by the latter body of symbols and abbreviations, useful in the science and practice of heating and ventilation, recommended by their Standardization Committee and adopted by the Institution at the autumn general meeting in October last year.

Notation	Signification
θ	"Therm." A synonym for the "British Thermal Unit." The Therm may be defined as the amount of heat absorbed by 1 lb. of water for a rise in temperature of 1 degree Fahr., the slight variation at normal temperatures being ignored for practical purposes under this term.
/	"Per." Ex:—5000θ/hr. (5000 therms per hour).
ft^2 or ⌗	Square foot.
in^2 or □	Square inch.
ft^3 or ⌖	Cubic foot.
in^3 or ⊏	Cubic inch.
°d	Degree difference.
T	Absolute Temperatures. Context indicating which scale.
t	Ordinary Temperatures. Context indicating which scale.
t_1 t_2	Initial and final temperatures.
ρ	Coefficient of friction for flow of fluids through conduits.
ζ	Coefficient of loss of energy in fluid streams due to passing single resistances.

The above table is, of course, supplementary to the symbols, &c., already generally adopted in physics, mathematics, and engineering.

PROBLEM OF DOMESTIC HOT-WATER SUPPLY.

By THOS. NEWTON.

MANY households are once more beginning to experience the drawbacks and the inconvenience of a hot-water system entirely dependent on a coal-fired range. During the cold weather, the waste of coal involved in heating water through the medium of the familiar back boiler of a coal-range somewhat escapes attention. It is only when quantities of hot water are required in warmer weather—without the attendant heat and dirt inseparable from the coal-range—that considerations of cost in terms of coal are ever thought of. Then comes the revelation as to what water-heating by this system really costs.

DISADVANTAGES OF THE COAL-RANGE BACK-BOILER.

The cost of obtaining hot water from a coal-fired range back-boiler in summer—when the initial temperature of the water and other things are in its favour—is obviously excessive. In colder weather the cost is not quite so obvious, but it is none the less very real. It is not quite so obvious, because the coal, which should be legitimately debited to the boiler, unconsciously gets debited to the range. Where the cooking is done by gas, and where, in summer, the coal-range is only utilized for the purpose of obtaining hot water from the back-boiler, the true perspective is at once seen. Instead of getting something for nothing, the process is pretty nearly reversed; and the waste of coal involved is appalling.

SERVANT DIFFICULTIES SURMOUNTED BY USING GAS.

The increasing scarcity of domestic servants is now patent to all; and in households dependent on crude fuel the inconvenience falls very heavily. Labour everywhere is at a premium; and anything which will lighten labour's task contributes to the national well-being. The difficulty of obtaining solid fuel for domestic purposes has already been experienced; but it is safe to state that the difficulty will probably be greater, rather than less, in the near future. The waste of man power, too, involved in handling and hauling an endless number of consignments of coal to the hundreds

of thousands of households in our towns and cities is as gigantic as it is unnecessary. Here, then, is ample scope for a communistic experiment along scientific lines; and the requisite organization is already at hand. By an extended use of gas, the waste will be eliminated, and the difficulties surmounted.

An extended use of gas for all conceivable purposes in the household will render the users of it immune from the labour difficulties and inconveniences associated with the use of crude solid fuel. Gas is a reliable and trustworthy servant, ever ready to give clean, silent, and effective service at any hour of the day or night. Moreover, it is under absolute control, and it is entirely dependable. For domestic purposes, it is probably the greatest labour-saving medium of the century.

WATER HEATING BY GAS.

When we turn to the specific problem of heating water by gas—particularly in hot weather—we at once realize that any system that will accomplish this, without at the same time heating any portion of the house, must have superior merits. One of the many defects of the coal-range system of water heating is that, to heat sufficient water for a bath, one must waste a lot of heat upon a mass of cold ironwork, and thus on the room where it is situated—all to no useful purpose. But with water-heating by gas this unnecessary waste of fuel and time is entirely obviated. Gas for water-heating gives quick and efficient service, and at a trifling cost. Where a hot-water pipe system having one or more draw-off taps is already in existence, it is generally better to instal a circulator; but, before doing so, it is desirable to examine the system with a view to improving it. Failure to do this stereotypes the defects which may be inherent in the system, and thus prevents economies in running costs from being effected. Preferably, the hot-storage tank or cylinder should be as close to the circulator as possible, in order to reduce heat losses (which mean gas consumption) due to radiation from the circulating pipes.

In the case of an obsolete tank system, advantage should be taken to reconstruct the pipes, and thus convert it to a modern cylinder system. A system having a secondary return to the hot-storage cylinder facilitates heat losses on account of the circulation of the hot water; and, incidentally, it may be remarked that this circulation of hot water causes heat to be imparted to the room or rooms through which the secondary return passes. This, of course, is objectionable in hot weather. The difficulty may be overcome by fixing a valve on the secondary return pipe just before it enters the cylinder; but this would result in a quantity of cold water having to be drawn off before the hot water became available. The quantity of cold water would be proportionate to the cubical contents of the secondary return. The point to be decided before making this alteration is whether the quantity of cold water would be deemed excessive. The gas consumption will be less with the valve fixed and closed than it would be without the valve. But if the quantity of cold water which would lie in the secondary return makes the fixing of the valve impracticable, the next best thing to do is to lag the secondary return with hair, felt, or some other non-conducting material.

There are several considerations which go to support the fixing of the valve. For example, it may be argued that cold water is necessary to reduce the hot water to bath temperature; hence the only practical difference lies in the fact that the hot water is added to the cold, instead of the cold being added to the hot. Further, where the draw-off tap is fairly constantly used, there is not a sufficient lapse of time to enable the water to become thoroughly cold. An arrangement which can be recommended is one which provides for a double-armed lever and chains being attached to the valve or cock on the secondary return. By simply pulling a chain, the hot water can be circulated or not, as desired. It should be borne in mind that heat losses are appreciably reduced by lagging the cylinder and pipes with some non-conducting material; and this is a point of great importance when it is considered that to reduce heat losses is to make water-heating by gas more economical, and therefore more popular. Some consumers are converted to the use of gas for water-heating when it is pointed out to them that the system can be arranged to work either independently or in conjunction with the coal-range. It is always advisable, however, to connect the flow-and-return pipes of the circulator direct to the cylinder, instead of connecting them to the flow-and-return pipes between the coal-range back-boiler and the cylinder. As a matter of fact, the latter should only be done as a last resort.

In the absence of a system of hot-water pipes, the usual practice is to instal a combined hot-water storage cylinder or tank with a gas-heated boiler, and then to run the hot-water supplies direct from the hot-storage cylinder to wherever they may be required. This arrangement possesses many advantages. The boiler is close up to its work; and consequently heat losses between the burner and the hot-storage are reduced to a minimum.

Whatever kind of apparatus may be decided on for a given set of requirements, it is essential that the burner should be thermostatically controlled; otherwise full advantages of water-heating by gas cannot be obtained. However, given such thermostatic control, the cost of gas-heated water averages approximately 1 foot of gas per gallon of water heated from normally cold to bath temperature. This applies to a highly efficient system; but an average of 1¼ ft. of gas per gallon of water raised from cold to bath temperature would apply generally. It will thus be seen that the cost of gas for heating (say) 25 gallons of water for a bath ranges from 1d. with gas at 2s. 9d. per 1000 c.ft., to 1¼d. with gas at 3s. 6d. Of course, the water may be obtained at a greater temperature than bath temperature, at an expenditure of an amount of gas proportionate to the extra number of degrees through which the water is required to be raised.

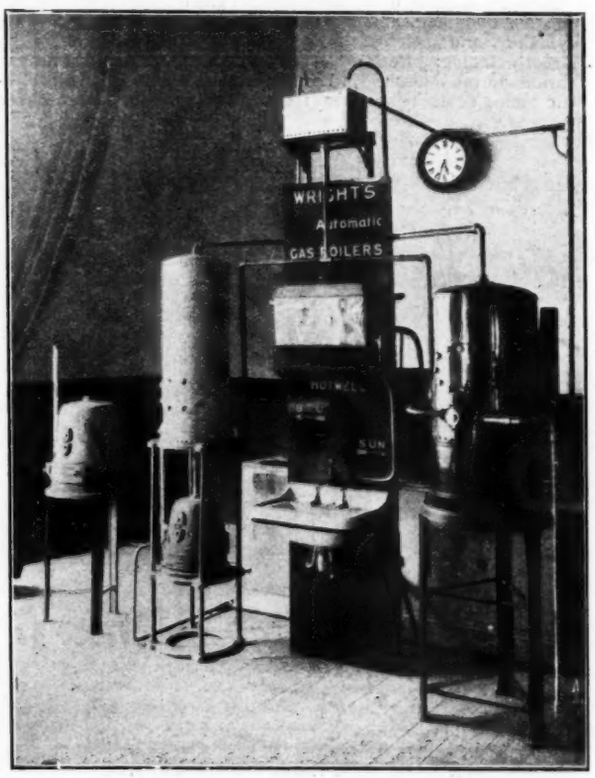
The foregoing methods of dealing with the domestic hot-water supply are intended to apply to those cases where more than one draw-off tap is in use. Where a supply of hot water is required at only one point, a geyser fixed at that point would answer the purpose admirably, and would give similarly satisfactory and economical results.

Finally, a word of warning may perhaps be allowed in connection with the gas supply. There is too much of a tendency to cripple the supply of gas to the various types of gas apparatus now in common use. This is a fatal policy, both for the undertaking and for the consumer. The best, quickest, and most economical results are always obtained when the gas supply is not only adequate, but ample.

GAS-HEATED WATER HEATERS.

A Show-Room Outfit in Dublin.

THE accompanying photograph shows a combined demonstration outfit in connection with gas-heated water heaters, which will be found both novel and of exceptional interest. The apparatus has been photographed as installed in the hot-water show-room of the Alliance and Dublin Gas Consumers' Company. As will be seen, it consists of three distinct appliances—the "Sun" boiler on the right of the photograph; the "Hotwell" in the centre; and the "B.T.U." on the left-hand side. This latter is arranged in the form of a builder's set—*i.e.*, with the storage cylinder mounted above the boiler.



The unique feature of the arrangement is that all three parts of the plant are connected-up to the lavatory basin and the cold-water cistern shown in the photograph; the arrangement of the connections being such that the show-room attendant can demonstrate separately the use and the respective advantages of each type of boiler, as applied to domestic hot-water supply. The lay-out also illustrates the automatic regulation of the gas supply to the boilers by means of the thermostat fitted to each.

The demonstration outfit shown was installed by Messrs. John Wright & Co., of Birmingham, who are the manufacturers of the three water-heating specialities shown.

A Committee has been appointed in Dublin—consisting of members of the Institution of Electrical Engineers, the Institution of Civil Engineers of Ireland, and the Engineering and Scientific Association of Ireland—to investigate and report upon the utilization of the peat deposits of Ireland.

EFFUSION METHOD OF DETERMINING GAS DENSITY.

Some Official Experiments.

A preliminary report of some extensive investigations on the bunsen effusion method is contributed to the American "Gas Age" by Mr. J. D. Edwards, by permission of the United States Bureau of Standards. Lack of agreement among users of it in practice led to controversy, especially in regard to large quantities of natural gas bought and sold; and by request of certain gas companies, the Bureau sought to discover sources of error, and develop the lines on which the best results can be secured.

In a preliminary series of tests, designed to indicate the accuracy of the method as applied by experienced observers under field conditions, using orifices of varying sizes, sometimes fairly reliable results are obtained; but under other conditions, important errors occur. Operating on a natural gas, specific gravity ·752, and a commencing pressure of 8 in. of water, falling to 1·5 in. or 2 in. at the conclusion, seven tests with orifice No. 13 gave results ranging from 0·704 to 0·648; seven tests with orifice No. 4 gave slightly higher figures, varying from 0·756 to 0·768; two with orifice No. 1 were still nearer the correct figure; and orifice No. 11 averaged 4 p.ct. low. Five tests on a gas of ·650 gave results within limits of 3·5 p.ct. low, and 1·1 p.ct. high. No consistent improvement was obtainable by varying the details of operation, nor was any satisfactory explanation forthcoming as to the discrepancies. The theory that the time occupied by effusion of equal volumes is directly proportional to the square root of the density, assumes that the process is isothermal, that there is no loss of energy by friction, and no difference between the physical properties of the gases compared, but is one of stream-line flow affected by these and possibly many other considerations.

Samples of gases comprising natural gas (3), and argon, carbon dioxide, hydrogen, and methane (1 each), were stored in steel cylinders, and their specific gravities accurately determined by direct weighing. Both displacement and expansion apparatus in various forms were used, with refinements such as automatic electric timing devices [see fig. 1] for use with mercury. Details as to

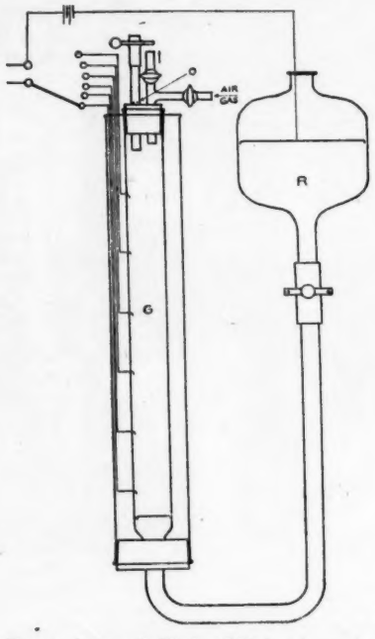


Fig. 1—Automatic Timing Effusion Apparatus.

the preparation of plates and orifices are given. Platinum-iridium (85 : 15) was found to be the most suitable material. The perforated plates were sealed between two short lengths of glass tube, mounted with cement in metal case tubes with threaded ends, marked A and B on each side of the plate respectively, so that the effect of reversing the direction of flow could be studied. A series of observations under average pressures ranging from 8 to 240 mm. of mercury, using the same orifice (28-B) throughout, on the four pure gases, yielded curves of characteristic form for each gas [fig. 2] but widely differing one from the other, and indicated that, while acertain pressure limit might show correct density for a given gas with a given orifice, there was no effusion pressure at which one orifice would give correct results with any gas; and that the necessary corrections were too complicated to admit of use in the form of tables. Also, that they were more marked at pressures below 40 mm. A low pressure must therefore be avoided; but it must not be assumed that the higher the effusion pressure the more satisfactory the result.

In enumerating the respective advantages and disadvantages of

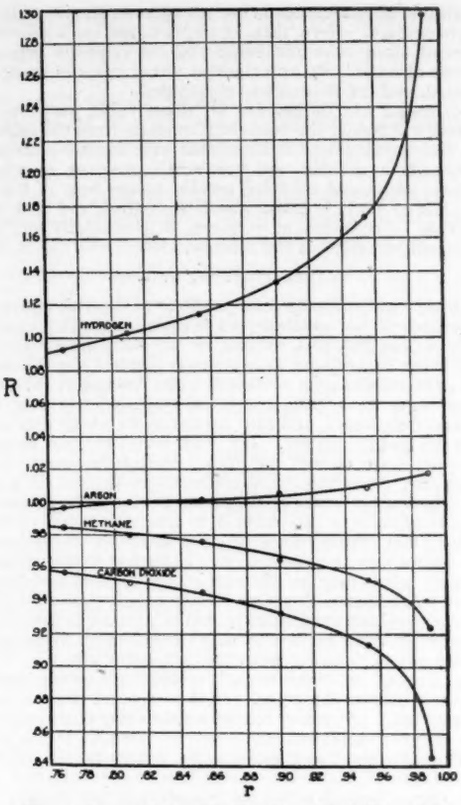


Fig. 2—Apparent Specific Gravity with Orifice 28 B.

using water or mercury as the confining medium, it is stated that the expansion of the gas in passing the orifice may lower the temperature to a degree sufficient to cause water condensation that would partly block the aperture, and lead to discordant results. Mercury is preferable for this reason; but its use is difficult when low effusion pressures are required. The shape and thickness, as well as the effect of burs or other irregularities, are also considered. A hole punched from *a* to *b* [see fig. 5] gave higher results when the flow of gas was in the same direction than when it was reversed; and the higher results were usually the more accurate. With any one gas, the curves at different pressures with different orifices were parallel—see fig. 3; and of 34 tests with methane (density = ·583), with orifices 0·07 to 0·37 mm. diameter and 0·02 to 0·10 mm. thick, 28 gave results so nearly accurate as to come within the range of experimental error. At 65 mm. pressure, 15 tests agreed within 1·5 p.ct. + or −; but with a pressure of 8 mm. the results were found to be more variable, though satisfactory figures were obtained, with certain dimensions.

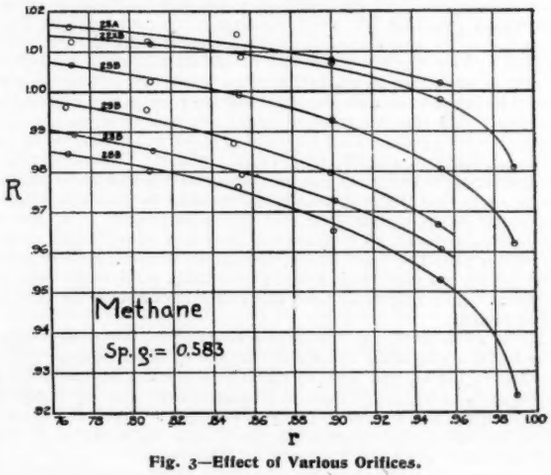


Fig. 3—Effect of Various Orifices.

The principal advantage of the expansion as compared with the displacement apparatus is the small quantity of confining medium needed, which is important when using mercury. But a working period sufficient to ensure close timing is essential to accurate results; and to give equal times the expansion vessel must be eleven times larger than the displacement vessel, with conditions the same. Reducing the size of the orifice, or increasing the effusion pressure, is only advisable within certain limits; so the displacement type is preferred for general use. In expansion apparatus, the water jacketed gas-container may be either cylindrical

or spherical, 150 to 200 c.c. capacity, and having a smaller container immediately below, so that a sufficient supply can be drawn at one operation to allow for the loss of bulk on compression. The pressure is supplied by a reservoir that can be adjusted at a suitable height, and a strong flexible tube connection. The same apparatus can be used either with water or mercury; and in the first case the finishing pressure should be less than 5 cm. With mercury, the test should start with 15 to 20 cm., and conclude with 1 to 2 cm. pressure. Constrictions in the connecting tubes do not affect the results, unless unduly long or small; so the tubes carrying the observation marks may be fairly small in diameter, to ensure close reading and timing.

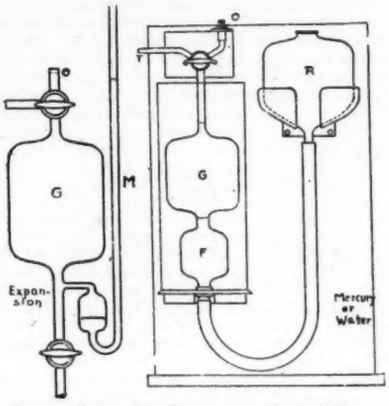


Fig. 4—Expansion Mercury or Water Types.

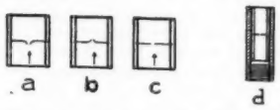


Fig. 5—Forms of Orifices (d is the Recommended Form).

For a mean effusion pressure of 95 mm., using mercury, an orifice 0·15 to 0·30 mm. in a plate not exceeding 0·05 mm. in thickness is advised; and for water and 8 mm. pressure, the size of the orifice should be 0·18 to 0·30 mm., and the plate not more than 0·04 mm. thick. With careful standardization, and correcting factors under some circumstances, the effusion method applied to gases of similar general nature is capable of giving results that are correct within a margin of 2 p.ct. With the usual laboratory precautions when dealing with gases, three or four consecutive tests of gas and air alternately should agree within 0·5 p.ct. An error in timing is doubled on the result, so an accurate stop-watch, occasionally standardized, is essential.

MIDLAND JUNIOR GAS ASSOCIATION.

Annual General Meeting.

The Tenth Annual General Meeting of the Association was held last Thursday evening, in the Reading Room at the Council House, Birmingham—Mr. G. C. PEARSON (the President) in the chair.

NEW OFFICERS.

The PRESIDENT said it was proposed to appoint an Hon. Treasurer; and Mr. T. F. E. Rhead, M.Sc., was proposed by Mr. W. J. Pickering, and seconded by Mr. F. J. Ward. Then Mr. J. H. Hardy had resigned the position of Hon. Auditor; and the Council proposed to ask Mr. W. P. Timbrell (Assistant Accountant to the Birmingham Corporation Gas Department) whether he would accept the office.

It was agreed that this should be done, on the motion of Mr. WARD, seconded by Mr. PICKERING.

The PRESIDENT said that, with regard to filling the vacancies on the Council consequent on the retirements under Rule 7, they had had nominations for Mr. W. Batt (Birmingham) and Mr. C. F. Tooby (Birmingham). There were no nominations for the four district members; but it was proposed to ask the four following members if they would accept the position: Mr. C. F. W. Rendle (Redditch), Mr. Ernest Scears (Rugby), Mr. S. J. D. Williams (Stourbridge), and Mr. W. H. Wise (Tipton).

This was agreed to, on the proposition of Mr. T. F. E. RHEAD (Birmingham), seconded by Mr. E. H. WRIGHT (Wolverhampton).

AN ALTERATION OF RULES.

The PRESIDENT said the next question was an alteration of Rule 7, which had been brought forward by Mr. Rogers: "The ex-President, and two immediate Past-Presidents, of the Association, and the President and Hon. Secretary, for the time being, of the Midland Association of Gas Engineers and Managers, shall be *ex-officio* members of the Council."

Mr. R. G. MARSH (Birmingham), moving this alteration, said it would greatly assist the Council in their deliberations.

Mr. WRIGHT seconded; and it was agreed to.

MEMBERS FROM TEACHING STAFFS.

The PRESIDENT said at the Joint Council meeting it was proposed that members of university staffs should be admitted as ordinary members of the Association—that was to say, whether or not they had anything to do with gas manufacture. It was the feeling of the Joint Council that it would be a great advantage to the different Junior Associations to have these new members; but it was necessary for this decision of the Council to be ratified by the meeting.

Mr. RHEAD proposed this, thinking it would be a good thing if the university people and those on the works understood each other better.

Mr. V. E. GREEN (Birmingham) suggested that members of the teaching staffs of technical schools might also be admitted on the same basis.

The PRESIDENT, in reply to a question, said that, if the alteration was extended in this way, it might mean perhaps a dozen new members. The interchange of views would be to the advantage of all; and Mr. Green's suggestion was a very good one. Of course, the idea was merely that these gentlemen should be eligible to become members of the Association if they wished. What was agreed at the Joint Council meeting was that the Junior Associations should open their membership to university staffs; so that if they included technical school staffs, they would have gone further than the other Associations.

Mr. RHEAD approved of this addition, and expressed his willingness to second Mr. Green's suggestion.

Mr. E. W. SMITH (Birmingham) strongly supported the idea that they should admit those of the technical school staffs, as well as the university staffs, who might apply to be made members. Personally, he would have preferred to confine it to the scientific staffs. Though it was not likely any others would care to come in, such a stipulation would indicate more clearly what they were driving at. They wanted to bring about a closer connection between science and their industry. He would propose that members of the scientific university and technical school staffs should be eligible.

Mr. GREEN seconded this, and it was carried.

THE NEW PRESIDENT.

The PRESIDENT said that in the ordinary course of things Mr. B. Skidmore, of Smethwick, should have been President; but early in the session he tendered his resignation. At the time, he was persuaded to withdraw it; but since then pressure of work had compelled him to resign again. The Council felt bound to accept this; so that Mr. R. G. Marsh (Birmingham), who was Junior Vice-President, automatically became Senior Vice-President, and had consented to fill the office of President for next year, throwing open the positions of Senior and Junior Vice-Presidents. The Council had elected Mr. Poulson (Stafford) Senior Vice-President and Mr. C. C. Barber (Saltley) Junior Vice-President.

EVENING MEETINGS.

The PRESIDENT referred to the experiment that had been tried of holding Thursday evening meetings, and said he would like the opinions of those present as to the success of the change. Thursday was fixed upon because it was the day on which members of the Senior Association met in Birmingham; and it was felt that they would be thus more likely to get seniors sometimes at their meetings.

Some discussion followed, in the course of which Mr. RHEAD moved that the meetings be held on Thursday evenings, but, if possible, so as not to clash with those of the Society of Chemical Industry. Mr. WRIGHT proposed an amendment in favour of Saturday afternoon; and Mr. A. KENDRICK (Birmingham) of Thursday and Saturday alternately.

The amendments were negatived, and the continuation of evening meetings decided upon.

The PRESIDENT, in view of the difference of opinion that had been manifested, proposed that the whole of the members should be circularized, so as to ascertain the general feeling upon the subject. The matter could then be dealt with again early next session.

Mr. MARSH seconded; but the suggestion was not agreed to by the meeting.

THE REPORT AND BALANCE-SHEET.

The HON. SECRETARY then read the report for the three sessions 1914-15, 1915-16, 1916-17, which the Council began by congratulating the members on having carried through the work of the three sessions in a highly satisfactory manner, having regard to the many difficulties experienced by reason of the war and absence of many members on actual war service. The number of ordinary members now on the books is 176, of whom at least 38 are away serving with the Colours. Unfortunately, several have been called upon to make the supreme sacrifice in the service of their country. So far as is known with certainty, the following members have been killed at the various fronts or on war duties, and their names are entered on the following

ROLL OF HONOUR.

H. H. Billingsley, Birmingham.	Stewart Smith, Coventry.
E. W. Blenkinsop, Warwick.	W. T. Treppass, Leamington.
B. F. Parsons, Birmingham.	B. Whitecombe, Birmingham.
Tom Rudge, Stafford.	A. E. Whittingham, Birmingham.

In addition, the Association have lost two valuable members in

Mr. T. Brooke, late of Nechells, and a member of the Council, who was obliged to relinquish his duties at Birmingham owing to ill-health, and has now definitely severed his connection with the Birmingham Gas Department; and Mr. W. S. Smart, who resigned his membership of the Association on taking up the position of Manager to Messrs. Jenkins & Co., Ltd., of Retford, and rejoined last year on taking up his duties again as Chief Draughtsman to the Birmingham Gas Department, and who died in May last. There has been added to the list of honorary members the name of Mr. E. B. Tomlinson, Engineer at the Nechells works. After expressing the Association's indebtedness to Mr. F. J. Ward, the President for the 1914-15 session, and to the present President, Mr. G. C. Pearson, the Council went on to state that the past session has been, taking all things into consideration, a highly successful one, and that the Association are entitled to consider the position a satisfactory one, having regard to the conditions prevailing at the present time. It was pointed out that the thanks of the Association are due to the Birmingham Municipal Technical School for the use of a room for the meetings during two of the sessions referred to, and that the Association are particularly indebted to the Birmingham Gas Committee for kindly granting permission for the use of the Reading Room at the Council House for meetings during the past session, and to Captain R. S. Hilton for his kind offices in this matter. There were no meetings of the Joint Council until this year, when a meeting was held in Birmingham. The question of education of the junior members of the gas industry brought forward by the President in the course of his inaugural address was fully discussed at this Joint Council meeting, and Mr. Pearson, together with Mr. J. G. Clark, of London, who is the new Hon. Secretary of the Joint Council, were appointed to act in the matter as regards representation to the Institution of Gas Engineers. The question of alteration in the membership rule was also discussed at this meeting, but no alteration was agreed upon.

The balance-sheet showed a balance in hand at June 30 of £8 8s. 9d.

On the proposition of Mr. Rhead, seconded by Mr. L. Sturdy (Birmingham), these documents were adopted.

The "Transactions."

It was next agreed that the course hitherto adopted, of having the Association's "Transactions" prepared in a separate volume, should be abandoned in favour of relying solely upon the volume of "Joint Transactions of the Junior Associations."

The Hon. Secretary, in putting forward the recommendation of the Council to this effect, said that the value of the joint volume would be still greater in the future, if the proceedings of the Scottish Junior Associations were included.

The motion was carried on the proposition of Mr. Wright, seconded by Mr. W. P. Atkins (Birmingham).

The Secretary's Services.

The President said he should like to propose a hearty vote of thanks to Mr. Pickering for the work he had, as Hon. Secretary, done on behalf of the Association. Everything was efficiently carried out, and affairs were kept in a splendid condition by him. The whole of the success of the last session was undoubtedly due to his efforts.

Mr. Marsh seconded the vote, which was supported by Mr. Rhead, and carried by acclamation.

Mr. Pickering acknowledged the compliment, and this brought the formal business to a close.

The members then settled down to an informal debate on the question as to whether gas for lighting purposes will be superseded in the future by electricity. The discussion was opened by Messrs. A. Whitehead and H. W. Dean (Birmingham).

Revision of Price at Drighlington.—The Drighlington Gas Company are notifying consumers that they propose increasing the price of gas 6d. per 1000 c.ft.—from 3s. 6d. to 4s. There will, however, be a revised scale of discount.

Edinburgh Gas Employees' Wages.—At a recent meeting of the employees of the Edinburgh and Leith Gas Commissioners, it was decided that the petition for an increase of 10s. per week should be determined by arbitration; that retort-men could not undertake to do more work, as had been suggested by the Commissioners; and that the increase asked for should apply to the consumers' clerks, gas-fitters, and temporary meter-readers, as well as to the general body of workers. The Salaries and Wages Committee of the Edinburgh Town Council have recommended that the officials of the Corporation should be placed on the same footing as regards a war bonus as the employees who recently received a war bonus of 10s. per week on the pre-war rate of wages.

Kelty Gas Company.—At the annual meeting of the Kelty Gas Company, Ltd. (Fife), the annual statement of accounts was submitted; and in moving its adoption, the Vice-Chairman (Mr. Rowan) congratulated the shareholders on the ever-increasing prosperity of the Company. After allowing £789 for depreciation, there was a balance of £1454. A dividend of 5 p.ct. was declared; and it was agreed to pay off debentures to the extent of £600 during the current year. The gas manufactured was 26,416,000 c.ft., a decrease of 551,000 c.ft.; but the gas accounted for showed a reduction of only 108,000 c.ft.—the leakage being reduced by 1·69 p.ct. The capital per million cubic feet now stands at £432, as compared with £743 seven years ago, when Mr. Henry Rule took over the management. The Directors unanimously voted Mr. Rule an increase of £25 in recognition of his valuable services.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The Elimination of Tar Fog.

Sir,—I have read with interest Mr. Marshall's remarks respecting "P. & A." extractors.

No doubt, they can be made to give good results; but my experience with five or six of them has not been satisfactory, and in all cases I have found it necessary to make use of considerable differential pressure. With our apparatus, there is no difference between the inlet and outlet pressure of the main stream of gas; and only about 20 p.ct. of the total volume has to be increased in pressure by 10 or 12 in.

I should also like to say that the altered machines on which our tests were taken have been working many months without any attention; and no one was more surprised than myself at the great difference in the quantity of tar and condensate extracted by them as compared with the results obtained when they were "P. & A." extractors.

J. Fisher, Assistant Engineer,
Tottenham District Light, Heat, and Power Company.

July 14, 1917.

"Coalite."

Sir,—Judging from the business doing in "Coalite" shares, the Company appears to be on the war-path again; and one is led to suppose that the public are induced to part with their money on the strength of the installation at Barnsley (Barnsley Smokeless Fuel Company), which is the latest offshoot of "Coalite." The fact that the Government (the Treasury) advanced £10,000 on debentures to the Barnsley Smokeless Fuel Company has been exploited for all it is worth. But the thoughtful man is inclined to inquire on what grounds the Treasury parted with public money for it.

Has the "Coalite" concern ever been able to prove to the Treasury its ability to provide a national demand, or has it even an experimental works which the expert advisers of the Government have been able to control so as to arrive at the data which justified the advance of the £10,000. The writer thinks not. Any sensible man would have hesitated, looking at the history of "Coalite."

It was conceived by the late Mr. Thomas Parker (a man quite ignorant of the elements of gas engineering), under whose technical guidance disaster after disaster overtook the concern—*vide* Wednesfield, Plymouth, and the colossal failure at Barking, which failures squandered practically half-a-million of pounds. Now "Coalite" is banking again on the plant at Barnsley—not even as yet tried.

Before the writer is the prospectus of the Barnsley Smokeless Fuel Company, and it repays study by one interested in "low-temperature carbonization," and conversant to a slight extent with the fundamentals underlying such processes.

Now in the first place, it is necessary to investigate the Barnsley claims. These are, generally, a smokeless fuel or coke containing a considerable percentage of volatile matter, which is known as "Coalite" (a good fuel if it *does* contain the alleged volatile matter), large volumes of motor spirit, benzol, toluol, zylol, and carbolic and cresyllic acid or oils.

Now to any scientific man conversant with the production of low-temperature oils or tars, it must be clear that benzol, toluol, and zylol, which are saturated hydrocarbons, cannot be produced in anything like payable quantities by a *bonâ-fide* low-temperature process, by which is meant a process working with iron retorts at a temperature varying from 1000° to 1200° Fahr. At these temperatures there might be traces of saturated hydrocarbons, but no more. The bulk of the oils would consist of unsaturated hydrocarbons or else paraffinoids known as motor spirits.

An expert of repute controlling the results at a low-temperature works near London has constituted the fact that the degree of temperature required for the production of the saturated or benzol series of hydrocarbons is not lower than 1400° Fahr.; that, to obtain the full value, the temperature must be raised from 1800° to 2000° Fahr., which is approximating to the temperature employed by gas-works in their fire-clay retorts.

One cannot produce benzol and at the same time motor spirits by the same operation; and it is clear that if the temperature is so raised as to produce the former, the resultant coke will not contain much volatile matter, and will approach the quality of ordinary coke.

Extraordinary secrecy has drawn a veil over the Barnsley plant, and the writer cannot find a description of it in any technical journal of standing. But it is reported that the retorts are of fire-brick—in fact, miniature coke-ovens. This points to the fact that they are a distinct departure from the original "Coalite" process, and in fact designed for a more or less high-temperature operation. This leads one to wonder what constitutes the "Coalite" patents, considering how they have wandered from the original sheet-iron tubes of Mr. Parker's day, through "slots" at Plymouth and Barking, to small coke-ovens at Barnsley.

But reading between the lines of the contracts entered into by "Coalite" (under agreement No. 5B.), it appears that a German invention of the Stettiner Chamotte Fabrik, Stettin, is forming one of the bases of the new Barnsley installation. Should this prove to be the fact, then our Treasury has gone out of its way to supply £10,000 of British money to back up a German invention.

Nemo.

July 13, 1917.

With a view to restricting the consumption of coal, the London County Council have arranged for the installation of gas fires and radiators at the Chief Station and the superintendents' stations of the fire brigade.

Mr. W. Dawes, of Normanton, who previous to enlisting twelve months ago was assistant at the Normanton Gas-Works, has been given a Commission in the R.G.A. (S.R.) Anti-Aircraft Section. Lieut. Dawes has been in training at the R.A. Cadet School, London, and the R.A. School of Gunnery, Shoeburyness.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.

Coal Supply in France.

Major NEWMAN asked the Prime Minister whether he was aware of the apprehensions felt by our French allies at the shortage of fuel in Paris and elsewhere during the coming winter, and whether, in the event of shortage of labour and tonnage preventing this country placing an adequate amount at their disposal, the Government would themselves take over certain coal mines and place the same at the disposal of the French Government—the coal to be worked by French labour, and transported in French bottoms to its destination?

Sir ALBERT STANLEY (the President of the Board of Trade), replying on behalf of the Prime Minister, remarked that the Government had already taken possession of the coal mines. The question of the maintenance of supplies of coal to the allies was one of shipping; and the Shipping Controller was taking every step possible to secure a supply of coal to our ally.

Major NEWMAN asked if the right hon. gentleman was fully aware of the anxiety felt in Paris on this question. It was very important.

Sir A. STANLEY said he appreciated that there had been a shortage of coal. He hoped they would take steps to secure some mitigation of the difficulty.

Coal Industry (State Control).

Mr. DUNCAN MILLAR asked the President of the Board of Trade whether he was in a position to announce the financial arrangements which had been entered into with the coalowners in connection with the State control of the coal industry.

Mr. ROBERTS, in reply, said a scheme had been drawn up, and had been very fully discussed with representatives of the Mining Association; but it had not yet been given its final form.

Mr. MILLAR asked how such a very long delay had taken place in settling the scheme, and whether it would be published in the form of a White Paper when it was completed.

Mr. ROBERTS said the negotiations had been more protracted than he contemplated when making previous replies. He would consider the latter question.

Workmen's Compensation Payments.

Captain WATSON asked whether, in view of the increased cost of living, the Government would take steps to increase the amounts payable under the Workmen's Compensation Acts to workmen and dependants.

Sir G. CAVE, replying on behalf of the Prime Minister, said the Government had had the question under consideration, and had consulted representatives of the employers and workmen on the subject. He hoped to be in a position shortly to make a definite announcement.

Bills Royal Assented.

The following Bills received the Royal Assent: Gas Light and Coke Company's Bill, Haslemere and District Gas Bill, Hemel Hempsted Gas Bill, Kenilworth Gas Bill, Lea Bridge District Gas Bill.

LEGAL INTELLIGENCE.

BIG WAR PROFIT ON A COAL-TAR DYE.

Enemy Coal-Tar Dye Patent.

The Patents Court heard on Thursday of a coal-tar dye bought at less than a shilling a pound before the war which has since been sold at more than a sovereign! The transaction was mentioned while Messrs. Levenstein, Ltd., of Manchester, were applying to have voided the German trade mark "Rhodamine," upon the ground that it was a generic name and not a name for a particular substance.

Mr. G. B. ELLIS, who represented the applicants, said they desired to make the substance known as "Rhodamine," which was a rose-red dye. Patent No. 15,374 of 1887, stated that the name applied "to the entire group of colouring matters belonging to the said series of phohaleines. The generic name of rhodamine may therefore henceforth be applied." The trade mark was registered by the Badische Anilin und Soda Fabric.

Mr. J. Y. JOHNSON, for the owners of the trade mark, contended that the Patents Court was not the Court before which the application to void should have been brought. It ought to have been tried out in the Law Courts.

Mr. ELLIS said this Court dealt with the patents of alien enemies. There was concurrent jurisdiction, because of emergency legislation.

The CONTROLLER OF PATENTS (Mr. Temple Franks) said he would report to the Board of Trade on the application, and Messrs. Levenstein, Ltd., would hear from them in due course.

ACRI-FLAVINE MANUFACTURE.

The novel question whether a coal-tar product, which is obtained by other means than those indicated in a German patent specification, can he said to be covered by the patent, was discussed last Thursday in the Patents Court before the Controller (Mr. Temple Franks) and Sir Cornelius Dalton.

The question was raised during an application to manufacture "acri-flavine" by Jeyes Sanitary Compounds Company, Ltd., who asked for licence to use the German patent No. 24,652, of 1910, in the name of Cassella, which is a patent for a yellow dye-stuff. This dye, however, had been discovered to be the finest antiseptic for war surgery.

Mr. G. B. ELLIS appeared for the applicants, and Mr. CARPMAEL for Casellas.

Mr. *Joseph Tertius Smith*, the Technical Adviser in charge of the manufacturing department of the applicant firm, gave evidence to the effect that he had been in communication with the Medical Research Committee, and they were prepared to do all they could to assist him in the establishment of a plant for manufacturing acri-flavine. The process was an extremely long and tedious one; and it took them weeks to manufacture the small quantity that up to the present they had obtained. Having, however, mastered the process, future production would be comparatively simple.

Mr. *W. C. Reynolds*, the Company's Chemical Adviser, mentioned the interesting fact that they had obtained acri-flavine by a process which was not set out in Casella's patent specification.

Mr. ELLIS asked whether, as they were not making the substance by the process described in the patent, they ought to pay royalty to the patentee.

Mr. CARPMAEL said that if the applicants did not pay a royalty for producing the same thing, the production was at their risk. After the war, they may have a claim for damages.

Mr. ELLIS said the applicants felt they had better have a licence to guard against any possible claim.

The CONTROLLER said the licence would be as in the previous cases—a purely nominal one.

Ex-Secretary of a Gas Company Sentenced.

At the Sussex Assizes, before Mr. Justice Darling, Russell Cory, aged 40, ex-Secretary of the Haywards Heath and District Gas Company, who was on bail, was indicted for forging and uttering cheques for the payment of £88 5s. and £68 13s. 9d., with intent to defraud, and also for stealing £91 17s. 2d., the money of the Haywards Heath and District Gas Company, under circumstances recorded in the "JOURNAL" for May 1, p. 196. Prisoner, who pleased guilty, wore the uniform of the R.G.A. Mr. R. Dratton Bushe, for the prosecution, said he was afraid the amounts mentioned in the indictment did not cover the whole of the defalcations, which were about £1000. For the defence, Mr. W. L. White, senior partner in a firm of chartered accountants, said prisoner was in the employ of the firm for many years, during which he was a good and capable business man. Lieutenant Thompsett, R.G.A., said prisoner belonged to his battery, which he joined on June 1; and from that time he had proved an extremely hard-working man and an excellent soldier. On behalf of the accused, Mr. Gordon said that in 1908 prisoner had an illness which appeared to have lessened his moral fibre. Unfortunately, he took to drink; and eventually he became indebted to a number of people. Instead of going to his friends for help, he commenced these defalcations. He was very anxious to take part in the war; and he hoped his Lordship would consider he was of far more use in the army, out of the way of monetary temptations. Prisoner did not agree that the defalcations amounted to so much as £1000. His Lordship said these defalcations had extended over a period of nine years. He could not, in the interests of public law, agree to the suggestion that prisoner should be allowed to go to France. He must inflict a sentence which he would pass in time of peace; and it must be left for the Home Office or the War Office to decide whether it should stand. Prisoner must go to penal servitude for three years.

MISCELLANEOUS NEWS.

ELECTRICITY AND GAS IN GERMANY.

RESTRICTIONS UPON CONSUMPTION IN THE ENTIRE EMPIRE.

[Translated from the "Vossische Zeitung," June 28.]

It has proved itself necessary to place the consumption of gas and electricity under regulation and control. As in Germany both are produced almost exclusively from coal, it is also a case here of preventing unnecessary consumption resulting in waste of coal, which should be reserved in the first place for purposes of the war and war equipment.

In order to secure expert supervision, a Special "Central Electricity and Gas Department" was instituted, and placed under the management of Prof. Kübler, with offices at No. 28, Königgrätzer Strasse, Berlin.

The increase in the consumption of electricity and gas during the year has been enormous. The consumption of electricity, which was 1916, in Berlin alone the increase on the corresponding month of the 2600 million K.W.H. in 1913, now amounts to 10,000 millions. In May, previous year was at the rate of 70 p.ct. The consumption of gas also shows an increase.

Part of the increase, of course, is attributable to war industries, in which work is, in many cases, carried on day and night. More gas than formerly is also being used for driving gas-engines, for crucible and tempering ovens, and for other ovens for technical purposes of the most varied character.

As peace-time superabundance had accustomed us to work with full margins, and without economizing through any anxiety, it is all the easier to impose restrictions without prejudice to our productive capacity—especially as exceptions will be made in cases of important war work.

The restriction in the case of electricity has been fixed to begin with at 10 p.ct.; and its application will be gradually extended from Berlin to the whole of the German Empire. How far a restriction in the use of gas is possible cannot yet be determined, as certain difficulties have

to be dealt with. Nevertheless, there is scarcely any doubt that the new department will find ways and means to bring about a restriction in the consumption of gas also, as desired.

One cause of the increased consumption of gas and electricity is doubtless attributable to the circumstance that in the past long and severe winter the delivery of coal could not be regularly maintained, owing to the freezing of the water-ways. As a consequence, there was a rush for gas and electric stoves, which in Berlin were sold-out in next to no time. In certain towns—*e.g.*, Frankfort-on-Main, the installation of new gas-fires and stoves has now been forbidden. Accordingly, we may in time expect regulations in regard to heating by gas and electricity to be applied equally over the whole of the German Empire, and thus avoid waste.

Our greatest extravagance has been in the matter of lighting. Already in peace time voices were raised on different occasions in protest at our revelry in such exaggerated amplitude of lighting. The number of lamps in use was constantly on the increase, as well as their lighting power. In restaurants, cafés, &c., the whole place was strewn with incandescent glow-lamps, and the chandeliers, &c,, also carried a considerable number. At the same time, the candle power was gradually raised from 16 to 25 c.p., then to 50 c.p., and, finally, to 100 c.p. ; so that one was dazzled. The many separate points of light were actually disturbing to the eyes—in fact, to such an extent that the matter received attention by eye specialists.

In dwelling houses also the use of glow-lamps in large numbers for ceiling illumination, in addition to many lamps on chandeliers, &c., became more and more general ; and at last 100 c.p. lamps were not uncommon. It is especially in this direction that much economy is possible. One still sees, when walking through the streets in the evenings, chandeliers in dwelling houses carrying six or twelve lamps alight. In the cafés also, in which one no longer reads newspapers, but which now resemble concert rooms, lamps are placed everywhere.

In Holland and France, for example, the front part of the café is generally kept fairly dark. with only the inner portion illuminated, as the people there like to observe through the large shop windows the movement on the street, and the light would interfere with their so doing. In general, therefore, the restriction in the use of artificial light can be easily carried through, although many do not know how they are to set about it. The matter is, however, very simple.

All one has to do is to look at one's electricity bill for the previous year, and, using one's electricity meter as a control, to arrange to use 10 p.ct. less than one did before. A very good way to secure a reduction in the consumption is to change the high candle-power lamps for low-power lamps, and to remove a number of the lamps from the chandeliers. For writing-table lamps, 16 or 25 c.p. is sufficient, especially if one provides for the reflection of the light on to the writing table by means of a white reflector. Altogether unnecessary in dwelling houses are 100 c.p. lamps. In addition, economy may be effected by reducing the period of lighting by 10 p.ct.—*i.e.*, one should only light up for 54 minutes instead of 60 minutes, as formerly. For instance, if one were accustomed to read from 8 till 11 in the evening, one would now leave off 18 minutes earlier.

In view of the many available means for securing economy in lighting, it will not be difficult for an individual to discover that which is suitable to his own case. Anyone who is able to apply several of these methods, and thereby secure a larger reduction than 10 p.ct., will be helping on our war equipment industry and the Fatherland.

THE WRECKED GASHOLDERS AT ASHTON.

Result of the Coroner's Inquiry.

All doubts which may have existed in the lay mind as to whether the two holders of the Ashton Gas Company (situated some 90 yards from the scene of the disaster at the Ashton-under-Lyne Chemical Works) exploded following the T.N.T. explosion on June 13 were set at rest at the adjourned inquest on the victims held by the Manchester County Coroner (Mr. G. S. Leresche) last Thursday.

All the witnesses examined by the Coroner were asked if they heard the gasholders explode, and not one of them could say that he did—in fact, several stated emphatically that nothing of the kind happened.

Walter Holmes, a plumber at the Chemical Works, stated that immediately after the explosion the gasholder on the Grosvenor Street side of the works seemed to part about a third from the top, and split round. The gas which rushed out was blown by the wind in the direction of Dukinfield, and became one mass of flame. There was a lot of burning material floating about in the air at the time.

Answering Mr. C. H. BOOTH, who represented the Gas Company, witness said the gas in this particular holder burned itself out. It did not explode. The top of the holder seemed to "lift" 12 or 15 feet, and then fall back into the tank.

A workman employed by the Gas Company said he was working at one of the holders at the time of the explosion. He heard a bang as though something had struck the holder, and then the gas became alight.

The CORONER : The holder did not explode ?

Witness : No, it collapsed.

Dr. *Edgar*, a representative of the Ministry of Munitions who is on the staff of the Explosives Supply Department, and who visited the factory immediately after the disaster, said he was perfectly certain that the gasholders did not explode.

Mr. BOOTH, at the conclusion of the evidence, said he wished to make a statement on behalf of the Ashton-under-Lyne Gas Company. There was an impression abroad, he said, that the holders belonging to the Company had exploded. The Company, before the inquiry opened, were perfectly satisfied that nothing of the kind did happen, or could happen. He would like to take the opportunity of satisfying the public mind on the point, however, by making the statement in open Court. The evidence was that only one explosion occurred, and that was at the chemical works. The holders were torn open by flying débris ; and consequently the escaping gas became alight and burned itself out. Immediately the explosion was notified to Mr. Joseph Townsley (the Engineer and Manager of the Gas Company), he turned off the gas at the works, and cut off the mains supplying the streets in the locality, thereby taking precautions against any explosion that might have occurred.

On behalf of the Directors of the Company, Mr. Booth associated himself with the sympathy which had been extended to the bereaved and the injured.

The verdict of the Jury was that the victims met their death by accident.

LABOUR-SAVING IN THE HOME.

Mrs. Peel on the Service of Gas.

Economy is in the air. It has penetrated the home in more ways than one. Labour-saving in the dwelling-house is being talked about, and labour-saving and economy are synonymous. Labour-saving does not mean neglect ; it means the abolition of unnecessary work by the utilization of modern means of doing things, and so the liberation of more time in which to do things better, and to promote more healthful conditions—particularly for mothers, for children, and for servants. The fathers are not heard much of in this matter. In this question of labour-saving in the home, the gas industry is concerned. Its domestic appliances are all labour-saving ; and therefore it is to its advantage that labour-saving in the home should be talked about freely, and that those engaged in this mission of emancipation from unnecessary domestic work should have complete knowledge of the value of what the gas industry has to offer. It all helps to make the ideal home.

The matter of labour-saving in the home was the subject of a lecture last Tuesday afternoon by Mrs. C. S. Peel, of the Ministry of Food, at the National Economy Exhibition, in the new London County Council Hall by Westminster Bridge. On the occasion, Mrs. Lloyd George presided. What was heard went to prove that the average home is built to make work, and not to save it. The widespread indictment made as to labour waste does not say much for individual energy in bringing about labour-saving conditions, though in personal reasons there should be ample inducement. Yet the waste of labour that goes on day by day means waste of time, waste of strength, and waste of lives. The suggestions for improvement that came from Mrs. Peel were many. But there was not one that she emphasized more than that, in order to save labour, there should be substitution of gas or electricity for coal. She also considered householders should demand a hot-water service as well as a cold-water service. Further, she advocated public kitchens. In this connection, she remarked that it must be realized once for all that human life and happiness are of more value than money. What followed showed that there had been good study of the waste of labour caused through coal purchase, delivery, storage, fires, and resultant ashes, dirt, smoke, and soot accumulation, together with all the consequent cleaning, all of which is multiplied by the number of fires in use, intensified by the kitchen coal-range. Eliminate coal, and Mrs. Peel (from her personal experience) states that one-third of the work of a household is saved, as well as the expense of extra cleaning and renovation. It was clear that from the work point of view, she abhors coal, and prefers gas or electric fires, supplemented by hot-water radiators. But there is a reservation. She likes to keep herself linked-up with the old barbarism of using raw coal and destroying all that it contains of benefit to mankind to the extent of having one coal-fire in the room in which she chiefly sits. We will not grumble at that. If all people could be got to become converts to rational heating to the degree that Mrs. Peel has become one, a great advantage to mankind would have been achieved.

But there are one or two criticisms to make of Mrs. Peel's advocacy. In company with gas heating, she suggested electric heating. National economy does not merely comprise labour and food ; it includes fuel. And the attention of this public counsellor may be directed to what is said to-day in our "Electric Supply Memoranda" on the relationship of electric-fires to the waste of the thermal and like value of the coal. On the other hand, the carbonization of coal at a gas-works not only produces gaseous fuel, but smokeless coke, dye requisites, materials for explosives making, sulphur for sulphuric acid, disinfectants, antiseptics, and many other things of vast importance. These are matters that should be in the *repertoire* of every public lecturer on national economy. There is also the hot-water-from-the-main plan. It looks possible enough to the layman or the laywoman. It does so to Mrs. Peel. "Then," said she, "you have to consider the washing and the cleaning bill. In our ideal house, we do away with all the bother of providing hot water ; and we wash and warm ourselves by hot water drawn from the main. If you can get a cold-water service, why not a hot-water one ? There is no reason. It can be done." What is more, Mrs. Peel says : "It must be done." We are always sorry to disappoint a lady. We admit that the supply of hot water by public mains can be done ; that it must be done is another matter. When the world is filled with plutocrats, and there are no poor, when there is no squalor, and everything is beautiful, we may be able to afford the capital expenditure which will admit of the lagging of street-mains to such an extensive degree that there will be little or no heat losses in the journeying of the hot water through the main streets and by-ways. This must be done ; otherwise the water would not run from the central heating station, and be delivered hot at the dwelling-house—especially in winter, and the worse the greater the distance. Of course, heat losses in circulation are not matters that appeal to the idealist ; and that the prevention of heat losses might make the expense of the public supply of hot water equal to the war time cost of beer—mayhap of spirits and even champagne—is a detail that does not hinder the free flow of thought and proposition. The public supply of hot water is an ideal that suffices for the platform. But we have to step from the ideal to the practical. A gas-heated circulating-boiler in the house, a gas-heated geyser properly flue fitted, a gas-heated copper, or a coke-heated circulating-boiler—any one of these comes within the range of practical politics without the uneconomy of a huge capital expenditure and an immense waste of heat.

Much more was, of course, heard as to how to bring labour in the

home to the minimum; and Mrs. Peel finished with the "text" with which she began: "The greatest labour-saving apparatus which we possess is the brain, and it has not been worn out by too much use," which has about it a large amount of truth, mixed judiciously with sarcasm on the prevailing indolence in the matter of the utilizing of means that save labour.

Questions were subsequently put by a number of members of the audience. Among the speakers was Mr. H. V. Lanchester, who asked that anyone who had suggestions to make on the subject of labour-saving in houses should address them to the Secretary of the National House and Town Planning Council at 41, Russell Square, W.C., who would submit them for consideration to their Technical Committee.

ROCHDALE GAS ACCOUNTS.

The Rochdale Corporation accounts for the year ended March 31 last show the income of the gas undertaking to have been £113,000, and the working expenses £90,000; leaving a gross profit of £23,000. The net profit is £3741, as against £15,000 the previous year.

Commenting on the matter, the Gas Committee state that there has been a reduction in the income from sales of gas amounting to £6412. The quantity consumed for lighting purposes being 54,868,400 c.ft., or 13½ p.ct. less than last year. Approximately one-third of this quantity is due to the reduction in public lighting and two-thirds to the general restriction in private consumption and the operation of the Summer Time Act. There has, however, been an increase of 8 millions in the quantity consumed for purposes other than lighting, attributable to the greater quantity of gas employed for industrial purposes in munitions and other works, as well as in hospitals and canteens, and the more general adoption of gaseous fuel owing to the difficulty experienced in obtaining supplies of coal. This difficulty has continued to be a source of anxiety to the Committee throughout the winter; for, notwithstanding the large stock of coal accumulated during the summer, it was reduced to dangerously small proportions before the severe weather came to an end. It was found impossible to secure contracts for more than about two-thirds of the normal requirements of coal during the year; but there were balances undelivered on previous contracts which sufficed to make up the difference between the quantity contracted for and the diminished quantity actually required. Although all coal mines have since been placed under Government control, the same difficulty in securing supplies still exists; and the problem of meeting future demands awaits solution.

Residual products realized satisfactory prices throughout the year; but the smaller amount of coal used has necessarily reduced the quantities produced, and the enhanced cost of labour and materials employed in their treatment has adversely affected the net income therefrom. This, however, has amounted to 11s. 2d. per ton of coal carbonized, compared with 9s. 11·9d. last year. The cost of coal, including cartage to the works and stacking, has been 20s. 6·7d. this year, as against 17s. 10·9d. last year—an increase of 2s. 7·8d. per ton, due to the fact that last year there were upwards of 24,000 tons of coal received at the prices current before the Coal Prices Limitation Act was passed. So that, in spite of the reduction in the quantity used, the cost of coal is actually £1520 more than last year.

The working expenses have been kept within the narrowest possible limits; and notwithstanding the drop in revenue of £6412 and the increase of £1520 in the cost of coal, the gross profit carried to net revenue account is only £5936 less than last year. The serious increase, however, in the charge for income-tax, amounting to £4958, materially diminishes the surplus; and there remains only £3741 net profit to be transferred to the appropriation account. This is inadequate to meet the annual charges of £4500 for the reserve fund and £1500 for working capital. There will remain, therefore, a debit balance on revenue account of £2258 at the commencement of the new financial year.

OLDBURY GAS-WORKS ACCOUNTS.

The annual report and statement of accounts of the Oldbury Urban District Council Gas Department has been issued by Mr. Charles H. Carder (the Engineer and Manager), who states that they have been fortunate in being able to maintain an uninterrupted and adequate supply of gas. The Ministry of Munitions have expressed their appreciation of the results obtained in toluene extraction; and plant has been provided to further assist the Ministry in the provision of high explosives. Public lighting was discontinued throughout practically the whole year, and the balance of the amount received under the public lighting contract has been placed to a reserve fund to meet the expense of reinstating the lamps and lanterns when lighting is resumed. Provision has been made for repayment of a first instalment of £500 of the loan raised to defray the cost of the No. 3 holder. The financial results on the whole are very satisfactory; and the overdraft they have so long had at the bank has been replaced by a balance in hand. The market for residuals has continued good throughout the year; the net revenue from this source being equal to 14s. 7·5d. per ton of coal carbonized, as compared with 13s. 2·2d. last year and 8s. 8·6d. the previous year. After making provision for depreciation of stocks, the accounts show gross profits of £6268, and a net profit of £2249.

The loan capital now outstanding is £54,674, and the amount repaid £30,724. The manufacture of gas cost £18,189; distribution, £1924; public lighting, £34; rents, rates, taxes, £2315; management, £456; war allowances and National Health Insurance, £679—total expenditure, £23,600, compared with £22,220 the previous year. The gross profit was £6268, compared with £6545, being equivalent to 10·76d. per 1000 c.ft. of gas sold. The amount required for interest and sinking fund was 6·72d. per 1000 c.ft. sold. On the income side, the

: WRIGHT'S :

GAS-HEATED OVEN

FURNACES

for Annealing, Hardening, and other Heat-Treatment of METALS. . . . .

VERY STRONGLY CONSTRUCTED.

LARGE RANGE of STANDARD SIZES.

UNIFORM TEMPERATURES SECURED.

ECONOMICAL GAS CONSUMPTION.

JOHN WRIGHT & Co.

ESSEX WORKS . . BIRMINGHAM.

sales of gas were: Prepayment meter supplies, 31,742,300 c.ft., revenue, £6724, against £5983 the previous year; ordinary meters, 56,293,100 c.ft., revenue, £9648, against £9487; motive power, 51,745,500 c.ft., revenue, £5915, against £4902—total, £22,288, against £20,372. For public lighting £600 was received, of which £565 is put to reserve for renewals. The income from residual products was: Coke and breeze (less haulage and labour) £6174, against £5687; tar, £776, against £853; ammoniacal liquor, £1323, against £1212; total (less discounts and allowances), £8038, compared with £7570. The total revenue was £29,868, compared with £28,765 the previous year. The net cost into holders was 17·43d. per 1000 c.ft. sold, against 17·58d. per 1000 c.ft. sold the previous year.

The profit and loss account shows interest and repayment on loans account £3909, income-tax undercharged in previous years £204, net profit £2249, against £3277 the previous year. The balance brought forward from last account was £3648; making a total disposable balance of £5897. Of this, £639 is transferred to capital account for the roof over the purifiers and new meters, mains, and services, and £1065 written-off the value of Consols; leaving £4193 to be carried forward. The balance at credit of loans account is £3768.

The working statement for the year shows: Coal carbonized, 10,988 tons, against 11,485 tons; coal gas made, 142,642,000 c.ft., against 145,161,000 c.ft.; carburetted water gas made, 17,728,000 c.ft., against 12,797,000 c.ft.; gas made per ton of coal, 12,981 c.ft., against 12,639 c.ft.; percentage of carburetted water gas, 11·05, against 8; gas sold and used on works, 141,553,900 c.ft., against 143,553,400 c.ft., leakage and unaccounted for, 18,696,100 c.ft., against 14,585,600 c.ft., being 11·66 p.ct. against 9·22 p.ct. The total gas sent out from the works was 160,250,000 c.ft., against 158,139,000 c.ft., an increase of 1·27 p.ct. The coke made per ton of coal was 12·3 cwt., against 12·50 cwt.; coke sold per ton of coal, 8·43 cwt., against 9·29 cwt.; tar made per ton of coal 11·3 gallons, against 10·9 gallons; liquor made per ton of coal, 25·9 gallons, against 26·1.

The report was presented at a meeting of the Council last Friday week; and the Chairman of the Gas Committee (Councillor E. W. Jackson) said they considered it very satisfactory, and so, he thought, would the Council and the ratepayers. The gross profit was £6268, compared with £6542 the previous year, and a gross loss of £1385 two years ago; while the net profit of £2249 compared with a net profit of £3277 the previous year, and a net loss of £1842 two years ago. They had wiped off the balance of the overdraft at the bank of over £1000, and had made some provision for the repayment of the loan of £6200 for the new holder. The sales of gas from slot-meters had decreased by 418,000 c.ft., and from ordinary meters by 2,205,000 c.ft.; but there had been an increase of 5,649,000 c.ft. in the sales for motive power. So that the net increase of sales was 3,026,000 c.ft.; while the revenue had increased by £1915. The coke sold had been less by 792 tons, as there was less coal carbonized and more water gas made, for which the coke was used; but the value of the coke sold had increased by £487. The average price per ton had been 26s. 6d., compared with 20s. 6d. at a neighbouring works and 19s. at a works farther away. The total value of the residuals had increased by £468, and it worked out at 14s. 7¾d. per ton of coal carbonized. The increased make of gas per ton of coal carbonized had saved 1350 tons of coal in the last two years. The average cost of coal had been 23s. 2d. per ton, against 22s. 3d. the previous year; and on the total quantity carbonized the increase was £503. Income-tax amounted to £1457, against £429 the previous year—an increase of £1028. During the current year they would have to provide £1000 out of revenue to meet the increased war bonus to the employees.

The accounts were approved.

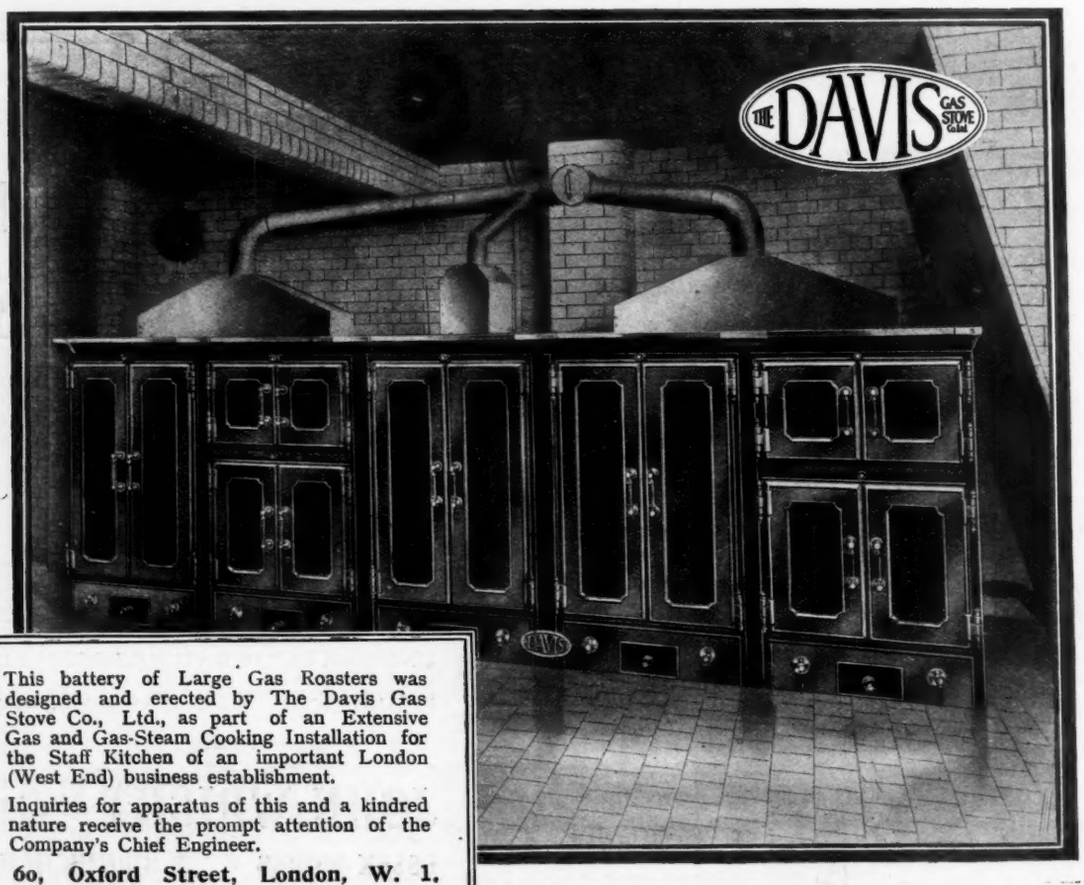
DUNFERMLINE GAS-WORKS.

At a Special Meeting of the Dunfermline Town Council, the report of the Special Committee appointed to deal with questions at the gas-works was presented.

The Committee are of opinion that the responsibility for the unsatisfactory state of the gas supply during last winter [*ante*, p. 32] rests primarily with the Gas Manager, but that the conditions were aggravated by the shortage of coal supply and by the use of coal which, having been in stock for some time, had deteriorated. The plant and machinery at the gas-works were ample for the supply of gas, but an error of judgment was committed when the horizontal retorts were allowed to fall into disrepair, and reliance was placed entirely upon being able to bring into use the newer vertical retorts under construction. These retorts are in a leaking condition, and incapable of producing the quantity of gas which they ought to be capable of doing, and this has arisen from lack of control of the subordinate workmen at the works. The Committee make the following recommendations: That the management of the accounting department be separated from the management of the works, and that all the other departments continue to be under the management of Mr. Waddell. That a competent Assistant Manager be at once appointed. That the repair of the vertical retorts be carried out at as early a date as possible. That an official be appointed who shall act as Accountant, Cashier, and Collector for the Gas Department, and be responsible to the Gas Committee direct.

The Council agreed to adopt the report and recommendations.

The report of the Committee is remarkable because of the absence of any reference to the serious labour troubles experienced at the gas-works during the past winter. Mr. Waddell, in his report, states that the difficulty of obtaining the necessary number of men suitable for working the plant was the root cause, and forms adequate explanation of the whole position of affairs at the works. The labour difficulty upset all calculations as to bringing into use at the beginning of the winter the new installation of vertical retorts, and the same cause prevented the retorts working to advantage. Mr. Waddell is agreeably



This battery of Large Gas Roasters was designed and erected by The Davis Gas Stove Co., Ltd., as part of an Extensive Gas and Gas-Steam Cooking Installation for the Staff Kitchen of an important London (West End) business establishment.

Inquiries for apparatus of this and a kindred nature receive the prompt attention of the Company's Chief Engineer.

60, Oxford Street, London, W. 1.

surprised at the condition of the vertical retorts requiring only that the cracks be properly repaired. He is quite satisfied that the design needs no serious alteration, and confirms his three years' experience with the first setting, which still continues to give good results.

OSSETT GAS-WORKS RESULTS.

In his annual report, Mr. Arnold E. Mottram, the Gas Engineer and Manager to the Ossett Town Council, states that during last year 147 million cubic feet of gas were made and 134¾ millions sold—a decreased make of 6½ millions and a decreased sale of 7¼ millions. Over three millions of the decreased output is due to the further restrictions of street lighting, and the remainder is due to the alteration of the clock by the Summer Time Act. The consumption by gas engines continues to grow very satisfactorily.

The gross profit for the year is £6537. Interest and sinking fund charges amount to £7532, leaving a loss on the year of £994. Deducting from this the balance of £257 brought forward from last year, leaves a net loss to carry forward of £737. The increased sum paid for income-tax alone amounts to £756, which more than covers the loss carried forward. Last year the Committee only paid the advanced price for coal for part of the year, so they have this year an increase of £519 to pay, despite the fact that they have used over 300 tons less. A greater war bonus by £117 was paid last year; and ammoniacal liquor has dropped £466. These items, together with the greatly increased price of all materials and labour, and the curtailment of lighting, have made it impossible for the Committee to return the usual profit. Of coke, 5285 tons was sold, equal to 10·2 cwt. per ton; liquor, 370,990 gallons, equal to 35·4 gallons per ton. No tar has been sold during the year undistilled, and the new plant was late in being completed, so that it only worked part of the season. War conditions and the severe winter made working very difficult during the busy period; but the Committee managed to keep up the full supply of gas. The short delivery of coal added to their difficulty, as they had to take out of stock 2500 tons. This was a double expense, as the coal will have to be replaced, if possible, before next winter.

WORKING OF THE KENDAL GAS UNDERTAKING.

The annual report of the Engineer and Manager (Mr. W. R. Wilson), which was presented at the last meeting of the Kendal Town Council, stated that the gross profit of the gas department for the year ended March 31 amounted to £4422; and after setting aside £3775 for interest and sinking fund charges and £69 for war allowances, there was left a surplus of £578. Out of this and the balance brought down, they had bought £1200 of War Stock and had voted £150 to the renewals fund. The reserve fund remained at £5000; and the sinking fund, including debt repaid, stood at £21,307. The total quantity of coal carbonized amounted to £7298 tons; being a decrease of 1443 tons, or 16·5 p.ct., on the previous year. The cost of the coal delivered on the works was £8908, or 24s. 4·91d. per ton. The gas made was 93,026,500 c.ft., being a decrease of 4,584,000 c.ft., or 5·88 p.ct. The gas sent out from the works showed a decrease of 5,878,900 c.ft., or 6·58 p.ct. Public lighting exhibited a decrease (on pre-war) of 6,614,400 c.ft. A comparison of results was given with the new Woodall-Duckham vertical retorts, against the hand-charged horizontals on a basis of 93,026,500 c.ft. annual make of gas. This comparison [which will be found on p. 75 of last week's "JOURNAL"] showed that on the vertical retorts there was a gross saving of £1745, and that after meeting the interest and redemption on capital outlay of £691 there remained a net saving of £1054.

Alderman Monkhouse, in presenting the report, said that the reason they had come out so well was, in the first instance, owing to the fact that they had substituted vertical for horizontal retorts. If they had delayed making the change, it would have been inevitable that they would have shown a rather serious deficit. The sales of gas had brought in £13,072, as against £13,736 the previous year; but the deficiency had been almost met by the very high price of residuals, which showed an increase of £489. Carbonizing wages were just about half what they would have been under the old system. They could well afford to keep gas at its present price; and compared with many other places they were very fortunate. Under the new system, they were making considerably more gas from less coal.

ANNUAL GAS REPORT AT WORKINGTON.

Woodall-Duckham Vertical Retort Results.

Reporting on the operations of the Workington Corporation gas undertaking for the financial year ended last March, the Engineer and Manager (Mr. Horace Chamberlain) says that this being the first complete year the new Woodall-Duckham vertical retort installation has been in operation, the working results must be taken as the standard for subsequent years. The object has been to obtain as high a yield of gas as possible; and the value of the increase has far exceeded the slight reduction in the quantity of residuals available for sale per ton of coal carbonized. Apart from this, the decreased quantity of coal required has enabled the Gas Department to meet the demand for gas, which was within 3 p.ct. of that of the previous year, and at the same time to effect the 10 p.ct. reduction in the quantity of coal carbonized, as requested by the Government. There were 9346 tons of coal used, compared with 10,372 tons the previous year; the total make of gas being 129,941,000 c.ft., against 133,910,000 c.ft.,

and the make per ton 13,891 c.ft., as compared with 12,910 c.ft. The unaccounted-for gas was reduced from 8·16 p.ct. to 7 85 p ct. The Borough Treasurer (Mr. John Noble) reports that the gross profit for the year is £3141, which is an increase of £358 on the year preceding. The net deficit is £142, which is more than accounted for by the increase in rates, taxes, insurances, and the price of coal.

The Mayor (Mr. F. Hall), in a separate report, makes the following allusion to the Woodall-Duckham vertical retorts.

We estimated that the increased earning capacity of a vertical installation, based on the carbonizing of 10,000 tons of coal per annum, at 15s. per ton, with a yield of 12,549 c.ft. of gas per ton of coal carbonized, would amount to £2560 per annum, as compared with the earnings for the year ended March 31, 1913.

The actual results for the past year are as follows

Extra cost of coal—viz., difference between 13s. 6d. per ton in 1913, and 20s. in 1917—6s. 6d. on 9346 tons of coal carbonized			£3037 9 0
Coal saved, owing to the increased yield of gas, 1917, 13,891 c.ft. per ton; 1913, 11,549 c.ft. per ton—viz., 2342 c.ft. per ton of coal carbonized equals (say) 1-5th, or 20 p.ct., equals 2336 tons 10 cwt. at (say), 10s. per ton (after allowing 10s. per ton for value of residuals)			1218 5 0
Increased rates and taxes:			
1917	£1495 15 0		
1913	937 17 7		
			557 17 5
Cost of management, including proportion of town hall salaries, collection, stationery, and printing, &c., establishment charges—			
1917	£810 16 8		
1913	650 9 3		
			160 7 5
War bonus (wages)			262 4 11
War wages (allowances to men on active service)			194 7 6
			£5430 11 3
Less—Difference in gross profit:—			
1913	£3773 13 5		
1917	3141 8 0		
			632 5 5
Net increased earning of new plant for the year ended March 31, 1917			£4798 5 10

Thus had the same prices and conditions obtained last year as they did in 1913, the Council would have had £4798 5s. 10d. at its disposal either for the reduction of the North Ward rates or of the price of gas, or a division between the two, instead of a net loss of £142, as per balance-sheet. It is hard lines for us, after spending £32,000 on new plant, that this remarkable increase in earnings should be swallowed up principally by the increased cost of coal. On the other hand, it ought to be a source of satisfaction to the consumers that the price of gas would have been at least 8d. per 1000 c.ft. more than they are now paying if we had been working on old lines.

The difference between the estimated profit of £2560 and the actual of £4798 is due to the initiative of Mr. Chamberlain. But it should be borne in mind that this could not have been done but for the wonderful control which is possible in the actual working conditions of our Woodall-Duckham plant, as it can, at the will of the operator (given a margin of working plant), be run at any speed of throughput he may determine.

Mr. Chamberlain discussed the lines on which our report was based, and showed that by an alteration of procedure, and by a slightly reduced yield of residual products, much better results could be obtained; and this, coupled with the fact that we are first and foremost gas manufacturers, and that the value of the bye-products (notably sulphate of ammonia) would, owing to the developments of the synthetic process of manufacture, after the war be very considerably reduced, and also that the selling price of tar, through the greatly increased and increasing quantity made by coking plants, had been reduced 12s. 6d. per ton, I agreed that he should turn his attention to increasing and obtaining every foot of good gas possible out of the coal, the result of which has been as set forth in the above figures.

When the reports came before the Council, it was pointed out that the price of gas has not been increased to the consumers.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *July* 16.

There is a fair demand for pitch for the home trade, and inquiries for shipment over next season are increasing. Makers, however, do not seem anxious to sell ahead. The Government have now taken control of all creosote, and sales can only be made under licence. Solvent naphtha continues in good demand. The price is 2s. 2d. to 2s. 3d. net and naked at sellers' works.

Considerable orders for sulphate of ammonia for agricultural purposes are being placed at the prices fixed.

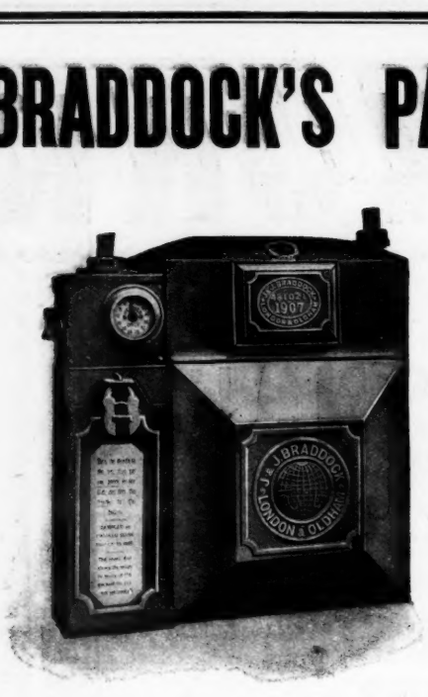
Tar Products in the Provinces.

July 16.

Markets for tar products remain the same. The prices given fo pitch are quite nominal.

The average values for gas-works products during the week were: Gas-works coal tar, 20s. to 24s. 6d. Pitch, East Coast, 16s. 6d. to 17s. 6d. per ton; West Coast—Manchester 15s. 6d. to 16s. 6d., Liverpool 16s. 6d. to 17s. 6d., Clyde 17s. to 18s. nominal. Benzol, 90 p.ct., North, 10½d. to 11½d.; 50-90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha, in bulk, North, 6½d. to 6¾d. Solvent naphtha, naked, North, 1s. 8d. to 1s. 9d. Heavy naphtha, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, 3¼d. to 3¾d. Heavy oils, in bulk, North, 3¾d. to 4¼d. Carbolic acid, 60 p.ct., East and West Coasts, 3s. 4d. naked. Naphthalene salts, 80s., bags included. Anthracene, "A" quality, 3d. per unit; "B" quality, 1½d. to 2d.

BRADDOCK'S PATENT "SLOT" METERS.



THE BEST SLOTS MADE.

No. 261. Dry "Slot" Meter.

No. 265. Wet "Slot" Meter.

J. & J. BRADDOCK (BRANCH OF METERS LIMITED), **Globe Meter Works, OLDHAM.**

Telegrams—"BRADDOCK, OLDHAM." National Telephone No. 815.

AND 45 & 47, WESTMINSTER BRIDGE ROAD, LONDON, S.E. 1.

Telegrams—"METRIQUE, LAMB LONDON." Telephone No. 2412 HOP.

COAL TRADE REPORT.

Northern Coal Trade.

There is a brisk demand for the best classes of coal, both steam and gas; but other qualities are easy. There is not only the continued scarcity of steamers, but the rules of the Controller need readjustment of the prices in some of the contracts. Best Northumbrian steams are steady at 30s. per ton f.o.b.; second-class descriptions are about 25s. 6d. to 26s.; and steam smalls are in ample supply at from 18s. 6d. to 20s. In the gas coal trade, the best kinds are firm, but other qualities are not so brisk. The home demand is a little firmer; and it must now be expected to grow week by week, as stocks are not thought to be heavy generally and the consumption should be larger. Exports are rather irregular—steamers being scarce. Best Durham gas coals are about 25s. to 25s. 6d. per ton f.o.b.; second-class qualities are quiet at about 23s. 6d.; and "Wear specials" are firm, and vary in price from 27s. to 30s. Nothing more is known as to the large contracts for gas coals. The regulations of the Controller "do not apply to coal conveyed to a port for shipment;" and this is the case with much of the gas coal of Durham. At the same time, the regulations introduce an element of uncertainty into the duration of contracts for part of the output—at least, until the extent of their influence on the coal trade is defined. Gas coke is from 30s. 6d. to 32s. per ton f.o.b., according to class and place of shipment. Coke freights are firm at 45s. to 45s. 6d. Tyne to Dunkirk.

Sheffield Gas Company's Bill.—The Parliamentary Committee of the Sheffield Corporation, reporting upon the Gas Company's Bill, say the Bill was considered by a Select Committee of the House of Commons early in May. In the first instance it was announced that the Company had decided to withdraw the clauses relating to the manufacture and supply of power gas; but they still desired the powers as to coke-oven gas. No deduction on account of the elimination of power gas was made from the capital powers asked for. In the result the Chairman announced that the Committee found the preamble of the Bill had been proved. They decided that coke-oven gas was not to be used for lighting purposes. Later, as the result of the action of the Corporation, a clause was added providing that if the Company do not within three years from the passing of the Bill secure powers to construct gas-works on a site not now belonging to them, their borrowing powers under the Act shall be reduced from £1,285,000 to £285,000. The Corporation lodged a petition against the Bill in the House of Lords; but as the Company, after a further interview, met the Corporation's requirements with respect to the interference with streets, and agreed to insert in the Act a clause satisfactory to the Highway and Sewerage Committee, and made other modifications at the request of the Committee, it was agreed that the petition should be withdrawn.

Creosote Restrictions.

The Minister of Munitions orders that all users or consumers of creosote oil, green oil, sharp oil, anthracene oil, or other oils with a specific gravity of 1·000 or more, distilled from coal tar, and all oils with a specific gravity of ·950 or more distilled from other tars, shall within fourteen days furnish to the Controller of Mineral Oil Production, M.P.S.3, No. 8, Northumberland Avenue, London, W.C. 2, particulars as to the source of supply, the quantity used during the first six months of 1917, the amount estimated for use for the second six months of the year, and the uses to which the oil is put. It is further ordered that, until further notice, no person shall, except under and in accordance with the terms of a licence issued under the authority of the Minister of Munitions, use any creosote (whether as a solvent or otherwise) for or in connection with the water-proofing, preservation, or treatment of timber or wood of any kind or description, or the manufacture, repair, preservation, or treatment of any road or path in the United Kingdom, or any part of such road or path. No person shall until further notice offer to sell, sell, or (except for the purpose of carrying out a contract in writing existing prior to such date for the sale of creosote) enter into any transaction or negotiation in relation to the sale of creosote, except under a licence. All applications for licences under this Order shall be made to the Director-General of Munitions Supply, Ministry of Munitions, Whitehall Place, London, S.W. 1, and marked, "Creosote Licence."

Reduction in Price at Preston.—The Directors of the Preston Gas Company have reduced the price of gas by 2d. per 1000 c.ft. from the first of this month.

Suggested Lighting of Cootehill.—The Cootehill (co. Cavan) Urban Council, having considered the question of the lighting of the town, have directed the Clerk to prepare a report on the subject of gas mains and lamps required.

Oldbury Gas-Works Employees' War Bonus.—The Oldbury Gas Committee, with the consent of the Council, have agreed to grant a war bonus to the employees at the gas-works of 1s. 8d. a day, making 9s. a week. This is in accordance with the Birmingham award, and means an increased burden on the undertaking of £1000 per annum. This extra sum is to be found out of the revenue next year.

Barnes and the Calorific Standard.—At the Barnes Urban District Council, a letter was read from Messrs. Lees & Co., Parliamentary Agents, with reference to the Richmond Gas Company and the calorific standard, and enclosing the Company's replies to the Council's objections to the application to the Board of Trade for an Order under the above Act. The Company concede three of the points raised, but object to (1) the abolition of the two hours notice of testing, and (2) the tests being made at any reasonable hour. It was resolved that Messrs. Lees & Co. should write to the Board of Trade pressing these two points.

BRASS WORK

WE HAVE A GOOD STOCK OF TAPS, &C.

Send us your enquiries.

SAWER AND PURVES

(Branch of Meters, Ltd.)

MANCHESTER. NOTTINGHAM.

The Future Demand for Benzol.

Questions are frequently asked as to the demand for crude benzol "after the war;" and an interesting side-light is thrown on the subject by an address delivered by Mr. V. H. Manning, Director of the United States Bureau of Mines, at a conference of the Business Publishers' Association, held at Washington. He said that notwithstanding increased production and reduced exports, the country was drawing on its stocks of petroleum and gasolene; and that conservation—not necessarily tying up, but wiser and more careful consumption—was urgently called for. Nearly 60 p.ct. of the total production of gasolene was consumed by automobiles, less than 25 p.ct. was exported, and the balance was used for various other purposes. Petroleum and its products, of which gasolene was only one, were an absolute national necessity. For one thing, the use of crude petroleum as a fuel should be stopped. Official records showed that the marketed production in 1916 was 295 million barrels—the largest yet attained; but during the year the stock had been reduced from 170 to 150 million barrels. The consumption exceeded the 1915 production by some 13 p.ct.; and if the normal peace consumption proceeded at the same rate during the present year, it would exceed the 1916 production by 40 million barrels. This did not take account of extra war consumption, obviously difficult to forecast, but in any case considerable, or of the fact that the 1917 output would probably be less than that in the previous year. Out of the stock of 150 million barrels, it was possible that 60 million barrels would be drawn before the end of the year. Products of coal distillation were used in Europe as motor fuels, and might in time be adopted in America, as the construction of bye-product coke-ovens was rapidly extending.

Malta and Mediterranean Gas Company, Limited.—At the annual meeting of the Company to-day, the Directors will report that the balance of the general revenue account for the year ended March 31 is £5405. They recommend the payment of the usual dividends on the first and second preference capital, and a dividend of 4 p.ct., free of income-tax, on the ordinary capital—making with the interim payment 6 p.ct. for the year. This will leave a balance of £678 to be carried forward.

Beehive Coke Production in the United States.—The production of beehive coke in 1916 was the greatest ever recorded in the United States; and the average value per ton was higher than in any previous year. The official figures published by the United States Geological Survey show that 35,464,224 tons, valued at $95,468,127, were produced last year. The output in 1916 represented an increase over 1915 of 7,955,969 tons, or 29 p.ct., in quantity, and $38,522,584, or nearly 68 p.ct., in value.

Coal Prices in the Isle of Wight.—That present prices are causing industrial unrest was emphatically declared in the course of an inquiry held, by direction of the Controller of Coal Mines, into the retail prices of coal in the Isle of Wight. It was stated that coal which could be sold at Southampton for 40s. and 41s. per ton was disposed of in the island at anything from 52s. to 56s. per ton. "The island was very seldom unanimous on any matter," said Alderman Fellows, of Cowes, "but it was absolutely unanimous in desiring cheaper coal." Major Sweetman stated that the military in the Isle of Wight received only one tender this year, to supply coal at 59s. per ton, as against 52s. 10d. in the previous year. It was iniquitous that they should be asked to pay such a price.

Macclesfield Gas Committee and Coal for Householders.—The suggestion was made at the last meeting of the Macclesfield Town Council that, in view of the Government's recommendation that householders should lay in stocks of coal during the summer months, the Gas Committee ought to obtain a large stock with a view to relieving any possible pressure during the winter. Alderman Isherwood, the Chairman of the Gas Committee, said a Sub-Committee had already been appointed, and they were dealing with the situation. If the Corporation thought there was likely to be any shortage of coal in the borough, no doubt they would purchase a quantity (say, 1000 tons), and store it in the gas-works' yard. If the coal was not disposed of, the Gas Committee could use it in the ordinary way.

Stockport Tar-Distilling Plant.—At the last meeting of the Stockport Gas Committee, the Engineer (Mr. S. Meunier) reported that he had had an interview with members of the Explosives Department of the Ministry of Munitions with reference to borrowing for tar-distilling plant, when a promise was made that the matter should be thoroughly gone into and the decision communicated. He also reported that on the same day he had an interview with the Priority Department of the Ministry of Munitions, and that, as a result, he had obtained a special permit and priority classification for the tar-distilling plant, and any material required for it. He stated that particulars of the annual repairs to be done were left with the Priority Department; and the classes and quantities of materials absolutely necessary had been forwarded in accordance with their request. The Council unanimously approved the action of the Engineer.

Coalite Shares.—In their "City Notes" last Thursday, the "Westminster Gazette" wrote: There are certain shares in the Stock Exchange markets which enjoy the reputation for spasmodic animation—patches of pronounced activity being followed by periods of comparative stagnation, the latter to be broken again by further briskness from time to time. Among these shares, those of the Coalite Companies afford conspicuous examples. Just now, British Coalite ordinary and deferred, and Coalite ordinary and deferred, make up a quartet in which an active business is being done. The buying of the shares comes from the Provinces as well as from London. Rumour has it that the Companies' patents dealing with the bye-products of coal, to assist in the generation of low power, are likely to turn out very valuable; and on the strength of the glowing future which is held to be ahead of the Company, a good deal of speculative buying is taking place. The difficulty at a time like this is to realize that the day will come when the market is certain to fall once more upon quietude; and that this day will probably arrive as soon as the mild speculation which is at present assisting the prices of the shares has petered-out, or flowed in other directions.

THREE POINTS

of advantage from the many found in our Slot Meters are:

1st.—They are Fraud Proof, and cannot be tampered with through the Slot.

2nd.—The Slot is closed when the maximum number of Coins have been inserted.

3rd.—Our Price-Changing System is the Simplest, Quickest, and most Accurate yet devised.

ALL PARTS INTERCHANGEABLE.

Tens of Thousands in use, and adopted exclusively by many Gas Companies.

WILLEY & CO., LTD.,

Exeter, London, Manchester, Leicester.

Telegrams:	Telephone Nos.:
"WILLEY, EXETER."	132 EXETER.
"GASVILLADO, KINLAND, LONDON."	294 DALSTON, LONDON.
"METERS, LEICESTER."	4777 LEICESTER.
"WILMETER, MANCHESTER."	7419 CITY (MANCHESTER).

LONDON WORKS & OFFICES:
89-95, Hertford Road, Kingsland, N.
LEICESTER:
5, Oxendon Street.
MANCHESTER:
John Street, Booth Street West, S.W.
AGENTS FOR SCOTLAND:
D. M. NELSON & CO., 20, WEST CAMPBELL ST., GLASGOW

A Deficiency at Carlisle.

The accounts of the Carlisle Corporation gas undertaking for the past financial year show a gross profit of £3583, compared with £2803 last year, an increase of £780. In the revenue account, the income exhibits an increase of £6540, of which £4314 is under the head of gas-rental, £2518 from coke, £302 from sulphate of ammonia, and £336 from fittings; while tar has brought in £919 less than last year. On the expenditure side of the account, the chief increase is under the head of manufacture, which is more by £5717, mainly due to the higher prices paid for coal and oil. Other items of increased expenditure are war bonus to workmen and officials, which is £1013 more than last year, and allowance to men serving with the army or navy, which is £279 higher. The charges for income-tax, repayment of loans, and interest, as set out in the profit and loss account, are £3947, an increase of £65. The deficiency on the year's working is £298, to which is to be added the balance from last year, £475, making a total deficiency on this account at March 31 last of £773. To this, the professional Auditors (Messrs. Blackburn) point out, must be added the £1760 charged to capital in previous years, and for which there were no borrowing powers. They hold that this should be cleared up by a transfer from the reserve fund, if it cannot be met out of revenue. When the details of the year's operations were presented to the Council, the Mayor (Alderman J. P. Buck) said he thought that they might congratulate the Engineer (Mr. E. G. Hutchinson) on the figures he had placed before them.

Price Increased at Brighton and Hove.—At the Hove Corporation a letter was read from the Brighton and Hove Gas Company, stating that, owing to the increase in the cost of coal, oil, and the increase in wages, the Directors are compelled to give notice of an increase of 4d. per 1000 c.ft. in the charge for gas as from the date of the meter readings for the June quarter.

Increased Output at Fraserburgh.—The output of gas at Fraserburgh shows an increase of 30·92 p.ct. upon the corresponding period of last year. There is an increase in the gas sales of £759, and in residuals of £174. Leakage for the past year exhibits a decrease of 1·34 p.ct., and the make of gas per ton of coal carbonized an increase of 615 c.ft. per ton. The price of gas is raised to 5s. 2½d. per 1000 c.ft. Coal for the works costs 26s. 6½d. per ton free on rail.

Waterford Gas Supply.—The Waterford Corporation have adopted a resolution for providing a plant to test the gas supplied by the Company. One member said the illuminating power of the gas at present was absurdly low; while another pointed out that the Company are taking out certain constituents of the gas for the Ministry of Munitions—testing of the gas being therefore prohibited during the war. Several members dissented from this; and the Mayor (Dr. J. J. O'Sullivan) said they could proceed for a penalty if the gas in their own establishments was not as per contract. Mr. B. O'Shaughnessy, F.I.C., was appointed Gas Tester.

Gas Affairs at Walsall.—The Gas Committee of the Walsall Town Council report that the net profit of the undertaking for the twelve months ended March 31 last was £2476, as compared with £7563 in the previous year. The following increased prices are to be charged for gas as from the June readings of the meters: In the borough of Walsall and district, for manufacturing and power purposes (including gas-driven vehicles), irrespective of quantity, a flat-rate of 2s. 4d. per 1000 c.ft.; for lighting and domestic purposes, 3s. (less 2½ p.ct. discount if paid on delivery or at the offices within one month of delivery); for slot meters (less 2½ p.ct. discount), 3s. 4d. In Pelsall, Shelfield, Aldridge, and Great Barr, for manufacturing and power purposes, irrespective of quantity, a flat-rate of 3s. 4d.; for lighting and domestic purposes, 3s. 11d. (less 2½ p.ct. discount as above); for slot meters, 4s. 2d. net. At the meeting of the Council yesterday (Monday) week, when submitting the annual report of the Gas Committee, the Chairman said that the undertaking had of late been passing through abnormal times, owing to the high prices of all raw materials. A loss of £1500 had been incurred owing to the restrictions on public lighting; while the cost of oil and materials had gone up by £4800, and rates and taxes by £3080. Compared with pre-war prices, coal had cost £11,176 more; while altogether the extra payments amounted to £16,833. The Council approved the proposal of the Gas Committee to increase the charges forgas.

News is to hand that Mr. William Wilmot, who has been one of Messrs. Falk, Stadelmann, & Co.'s country representatives for fifteen years—latterly more particularly covering the Manchester district—has, after a few days' illness, died from pneumonia. He recently joined the R.N.A.S., and almost immediately was attacked by the illness which caused his death.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for July 11.]

Nos. 9496—9857.

ALEXANDER, G. H.—"Fluid-flow measuring or indicating instruments." No. 9798.

CARMONT, W. H.—"Gas-stove." No. 9599.

COPISAROW, M.—"Treatment of crude anthracene to isolate main constituents therefrom." No. 9559.

HIGGINS, W.—"Portable gasholders." No. 9643.

HOLLINGDRAKE, H.—"Means for controlling flow of liquids." No. 9799.

NASH, R. J.—"Fluid-flow measuring or indicating instruments." No. 9798.

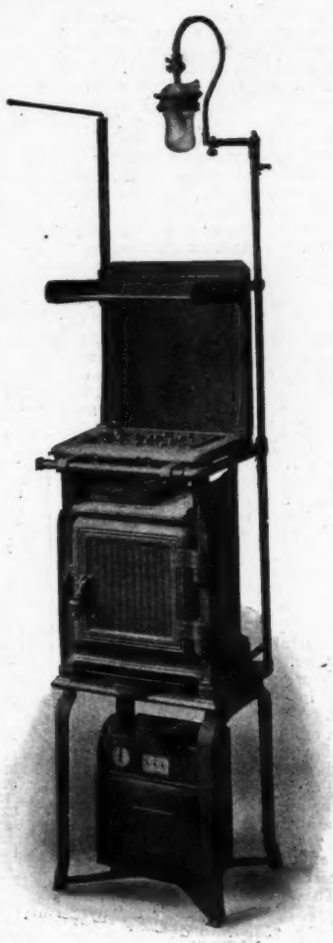
POORE, P.—"Destructive distillation of wood." No. 9667.

SULMAN, H. L.—See Poore, No. 9667.

TURNER, F.—See Hollingdrake. No. 9799.

WELSENAAR, J. H.—"Burners for cookers, &c.." No. 9678.

Slot Installations



Our compact Combination Set is solving the fitting-up problem.

A Slot Meter.
A Cooker at working height.
A Plate Rack with enamelled back plate.
A Towel Rail
and
An Inverted Burner together with T-piece connection for extensions.

Saves labour, material, and space.

Let us send you full particulars.

R. & A. MAIN, LTD.

WORKS: Gothic Works, EDMONTON, N.; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.

SHOW-ROOMS AND BRANCHES: 25, PRINCES STREET, OXFORD CIRCUS, W.; 82, Gordon Street, GLASGOW; 83, Old Market Street, BRISTOL; 18, Severn Street, Deansgate, MANCHESTER; 97, Millfield, BELFAST; 333, Queen Street MELBOURNE; and 12, Cunningham Lane, Pitt Street, SYDNEY, N.S.W.

Dividends declared by Scottish gas undertakings include Langholm Gas Company 6 p.ct., and Catrine Gas Company 1s. per share. The cost of gas coal at Catrine, including cartage, is 20s. 6d. per ton. At Kirriemuir, the dividend is 6 p ct., and a sum is set aside for depreciation.

The Motor Bus Department of the Todmorden Corporation are experimenting with coal gas. The flexible holder has a canvas outer covering, with an inner layer of rubber. So far as the experiments have gone, it is considered that the cost of working with gas will be only about one-fourth of that of petrol at its present prices.

STOCK MARKET REPORT.

THE course of things on the Stock Exchange was to a large extent just the counterpart or continuation of the week before. The general tone was calm, confident, and cheerful. A momentary pause, it is true, occurred on Wednesday, owing to the Nieuport incident, painted very red in Hun despatches. But when its minor importance became known, all went well again. The wonderful progress of Russian arms in Galicia was once more the potent factor to inspire the situation and endow the markets with solidity and strength. But here, again (as in the week before), the unwelcome feature was the persistent shrinkage in the volume of business. There is a pronounced reluctance to sell, and markets are denuded of stock. If some impatience is felt at this, there is, on the other hand, a growing conviction that the war is quickening to a close, and that with peace commercial activities must revive.

The gilt-edged market remained steady. Home Government issues, with War Loan in the van, were firm, and Indians and Colonials were in demand. Home Rails began well, but fell very quiet towards the close. The American Market fluctuated, and Argentines moved fitfully at times. The Foreign Market had many interesting points. Russians progressed steadily, as might be expected, the French Loan was in good demand, and Scandinavian and Brazilian found favour. There was some inquiry for British Coalite—based, it may be assumed, on some expectations.

Business in the Gas Market showed a pleasing improvement in point of activity; and, if we were not now so nearly approaching the August season of slackness, one might almost hope for a real revival, but it will scarcely have time to materialize. Bargains were well distributed; and there was a welcome accession of undertakings in which operations are not often recorded. The general tendency, too, was favourable, and prices seemed to be creeping up; while changes in quotation were mostly in the upward direction. This feature was very noticeable in all *ex-div.* variations.

Bargains done for cash during the week were as follows: On Monday, European 11¼, Gas Light ordinary 71⅞, 72¼, ditto debenture 57, Imperial Continental 80¼, 80½, 80⅜, 81, Monte Video 8⅜, Newcastle 70½, South Metropolitan 74⅝, 75. On Tuesday, Alliance and Dublin 51½, European 11⅜, Ilford "A" and "C" 97½, 97⅝, ditto "B" 76½, 76⅜, ditto debenture 66, 66¼, Imperial Continental 80, 80¼, Primitiva 38s. 6d., South Metropolitan 74, 74¼, Tottenham "B" 70, 70½, Harrow 5 p.ct. 84⅞, 85. On Wednesday, Gas Light ordinary 71½, 71 11/16, 71⅞, 72, ditto maximum 57, 57½, ditto preference 73, 73½, ditto debenture 56½, Imperial Continental 81, South Metropolitan 74, 74⅛, 74¾. On Thursday, Brentford "B" 80½, Commercial 3½ p.ct. 67½, Continental Union preference 61, European 11¼, 11⅜, Gas Light ordinary 71⅜, 72, 72½, 72¼, 72⅛, ditto maximum 56½, 57½, ditto preference 73½, ditto debenture 56⅜, Monte Video 8½, Primitiva preference 60s., South Metropolitan 74, Barnet "C" 137, Gloucester ordinary 78½, 79. On Friday, Buenos Aires 54¼, 54½, Cape Town 2⅜, Commercial debenture 51½, Gas Light ordinary 72, 72¼, 72⅜, 72½, Imperial Continental 80, 80½, Newcastle 70¾, Primitiva 38s. 9d., 39s. 3d., preference 60s., South Metropolitan 74, 74½, Maidstone 54⅜, 54⅝.

The Bank rate is 5 p.ct., as fixed on April 5.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Previous Div or Dividend and Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
175,472	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	5⅜–6⅜	..
1,551,868	,,	April 8	2½	5⅛%	Alliance & Dublin Ord.	59–64	50–55	51½
874,000	,,	July 10	4	4%	Do. 4 p.c. Deb.	76–79	57–62*	..
280,000	5	April 29	7½	4/6	Bombay, Ltd.	5⅞–6⅜	4⅜–5⅛	..
50,000	10	Feb. 26	16	15/-	Bourne- { 10 p.c.	23–30	24–26	..
393,110	10	,,	7	7/-	mouth Gas { B 7 p.c.	15–15½	10⅜–11¼	..
115,000	10	,,	6	6/-	and Water { Pref. 6 p.c.	13½–14	9¼–9⅜	..
159,740	—	—	—	4%	{ 4 p.c. Deb.	..	6⅜–7⅛	..
992,045	Stk.	Feb. 26	14	5 1/16%	Brentford A Consolid.	261–266	79–82*	..
734,930	,,	,,	11	4⅛%	Do. B New	204–209	77–80*	..
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109–111	81–86*	80½
231,400	,,	June 11	4	4%	Do. 4 p.c. Deb.	91–93	65–67	..
317,380	,,	Feb. 26	11	10%	Brighton & Hove Orig.	208–213	150–155	..
244,200	,,	,,	8	7%	Do. A Ord. Stk.	154–159	102–107	..
530,000	20	Mar. 26	12½	22/6	British	44–45	38–34	..
190,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88–90	66–68	..
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85–87	51–56	54½–54½
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1½–2½	2½–3	2¾
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4–6	6½–7½	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70–75	60–65	..
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108–110	79½–80½	..
1,513,380	,,	Feb. 12	5/9/4	49/4	Commercial 4 p.c. Stk.	106–108	72–74	..
560 000	,,	,,	5½	46/8	Do. 3½ p.c. do.	103–105	67–68	..
475,000	,,	June 11	3	3%	Do. 3 p.c. Deb. Stk.	69¼–71½	51–53	67½
800,000	,,	,,	4	—	Continental Union Ltd.	76–79	39–41	51½
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115–118	60–62	..
278,400	—	—	—	11⅜%	Croydon B and C 7 p.c..	..	170–180	..
—	—	—	—	10%	Do. E	..	..	..
492,370	Stk.	—	6	5⅛%	Derby Con. Stk.	123–125	95–100	..
55,000	,,	—	4	4%	Do. Deb. Stk.	102–104	80–83	..
1,002,180	10	July 29	10	7/6	European, Ltd.	17½–18	11–12	11⅜–11⅝
16,313,430	Stk.	Feb. 10	4/17/4	42/-	Gas { 4 p.c. Ord.	98–102	71–73	71½–72½
2,600,000	,,	,,	3½	3½%	Light { 3½ p.c. max.	76–79	56–58	56⅜–57½
4,062,235	,,	,,	4	4%	and { 4 p.c. Con. Pref.	96–99	72–74	73–73½
4,674 850	,,	June 11	3	3%	Coke { 3 p.c. Con. Deb.	72½–74½	55–57	56½–57
130,000	,,	,,	10	10%	{ 10 p.c. Bonds	..	..	..
258,740	,,	Mar. 12	5	4½%	Hastings & St. L. 3½ p.c.	87–89	50–55	..
70,000	10	April 29	11	6%	Hongkong & China, Ltd.	16½–16¾	7½–8½	..
86,600	—	—	—	9½%	Hornsey 7 p.c.	..	120–130	..
131,000	Stk.	Mar. 12	7½	7½%	Ilford A and C	151–154	95–100	97½–97⅝
65,780	,,	,,	6⅝	5½%	Do. B	115–118	75–80	76½–76⅝
65,500	,,	June 26	4	4%	Do. 4 p.c. Deb	92–94	65–68	66–66½
4,940,000	,,	May 14	9	4½%	Imperial Continental	150–160	79–84	80–81
1,235,000	,,	Feb. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84–86	62–65	..
235,242	,,	Mar. 12	6½	6½%	Lea Bridge Ord. 5 p.c.	119–121	85–90	..
2,498,905	,,	Feb. 26	10	5%	Liverpool 5 p.c. Ord. { A	211–213	..	..
306,083	,,	June 26	4	4%	{ B	146–148	82–83	..
75,000	5	June 11	6	2/-	Do. 4 p.c. Pr. Deb. Stk.	..	72–74	..
250,000	100	April 1	4½	4½%	Malta & Mediterranean	4½–4⅝	3⅞–4½	..
541,920	20	May 28	4	6/-	Met. of { 4½ p.c. Deb.	99–101	88–98	..
1,875,892	Stk.	July 29	4½	4½%	Melbourne	11¼–12	8–8½	8⅛–8⅜
529,705	,,	June 26	3½	3½%	Monte Video, Ltd.	98½–99½	70½–71	70½–70⅝
55,940	10	Feb. 26	7/14/0	7/10	Newcastle&Gatsh'dCon.	82–83	71–73	..
800,000	Stk.	May 14	8	8%	Do. 3½ p.c. Deb.	14–15	10–11	..
60,000	5	Mar. 26	10	1/-	North Middlesex 7 p.c..	117–122	104–106	..
60,000	50	Feb. 26	13	12½%	Oriental, Ltd.	7¼–7⅝	2–3	..
100,000	50	,,	12	11½%	Ottoman, Ltd.	128–131	92–97	..
52,000	50	,,	10	9%	Portsea, Island B	118–121	85–90	..
249,980	5	April 29	8	—	Do. C	..	..	..
499,960	5	June 26	5	2/6	Do. D	..	..	..
521,600	100	June 2	4	4%	Primitiva Ord.	5⅛–6	1⅞–2⅛	3 2/6–3 9/3
—	—	—	—	4%	Do. 5 p.c. Pref.	4⅜–5	2⅜–3⅛	60/-
346,198	Stk.	June 26	4	4%	Do. 4 p.c. Deb.	91–93	78–80	78⅜–79
150,000	10	May 14	6	6/-	Do. ,, ,, 1911	..	..	..
125,000	50	July 1	5	5%	River Plate 4 p.c. Deb..	85–87	59–64	..
135,000	Stk.	Mar. 12	10	10%	San Paulo { 6 p.c. Pref..	10½–11	7⅜–8⅛	..
209,984	,,	,,	10	10%	{ 5 p.c. Deb..	47–49	40–42	..
523,500	,,	,,	10	10%	Sheffield A	223–224	..	..
90,000	10	May 28	9	6/-	Do. B	222–224	178–182	..
6,609,895	Stk.	Feb. 10	5/4/0	46/8	Do. C	220–222	..	..
1,895,445	,,	July 10	3	3%	South African.	10½–11⅛	8⅜–9⅛	..
224,820	,,	Feb. 26	8½	8%	South Met. 4 p.c. Ord.	111–113	73–75	74–7
952,795	,,	,,	6	48/4	Do. 3 p.c. Deb.	72½–74½	55–57*	..
60,000	—	,,	5	5%	South Shields Con. Stk.	157–159	140–142	..
135,000	—	—	—	48/4	S'th Suburb'n Ord. 5 p.c.	114–116	7⅜–78	..
187,568	Stk.	June 26	5	5%	Do. 5 p.c. Pref.	110–112	77–79	..
647,740	,,	May 14	5	5%	Do. West Kent	..	..	..
130,000	,,	Feb. 12	7½	5%	Do. 5 p.c. Deb. Stk.	116–118	86–88	..
782,275	,,	,,	6	3¾%	Southampton Ord.	99–102	76–78	..
181.255	,,	June 26	4	4%	Tottenham { A 5 p.c.	135–138	95–100	..
182,380	10	Dec. 30	5	—	District { B 3½ p.c.	115–117	68–73	70–70¼
149,900	10	July 1	5	5%	{ 4 p.c. Deb.	87–89	63–65	..
236,476	Stk.	Mar. 12	5	5%	Tuscan, Ltd.	5–6	1–2	..
					Do. 5 p.c. Deb. Red.	93–95	60–65	..
30,000	,,	Feb. 26	8¾	80/-	Tynemouth 5 p.c. max..	108½–109½	89–91	..
255,636	,,	,,	6¼	65/-	Wandsworth, Wimble-			
108,075	,,	,,	5/17/8	56/-	don, and Epsom—			
352,000	,,	,,	6¼	58/9	Wandsworth A 5 p.c..	151–156	114–119	..
98,000	,,	,,	6⅜	65/-	Do. B 3½ p.c. .	129–134	99–101	..
88 416	,,	June 26	3	3%	Do. C 3½ p.c. .	110–115	86–91	..
					Wimbledon 5 p.c. .	117–122	88–93	..
					Epsom 5 p.c.	121–126	96–101	..
					3 p.c. Deb. Stk.	66–69	50–53	..

* Ex. Div.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

WORKING MANAGER. No. 6327.

ENGINEER AND MANAGER. Stratford-on-Avon Corporation. Applications by July 31.

WORKS MANAGER (Tar Works). No. 6325.

ASSISTANT MANAGER. Peterborough Gas Company.

REPRESENTATIVES. No. 6316.

SULPHATE MAKER AND YARDMAN. Tiverton Gas-Works.

STOKER. Tiverton Gas-Works.

Appointments, &c., Wanted.

SHOW-ROOM AND SALES MANAGER. No. 6326.

Plant, &c., for Sale.

COOKERS. Alliance and Dublin Consumers' Gas Company, Hawkins Street, Dublin.

TENDERS FOR

Coal.

MACCLESFIELD GAS DEPARTMENT. Tenders by July 28.

Crude Gas Liquors.

BLACKPOOL GAS DEPARTMENT.

Purifying Material.

EDINBURGH AND LEITH GAS COMMISSIONERS.

Tar and Liquor.

MALVERN GAS DEPARTMENT. Tenders by July 23.

H. MITCHELL, FOR PATENT SLOT METER PAD & OTHER LOCKS. KENTISH TOWN, N.W. H. & J. DEMPSTER, LTD., 54 & 3300 Manchester.